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What a zig-zag path, how unlike a straight line is man's progress in search of Truth.—Michael Foster.

It is strange that although the idea of a forward motion rather than an ebb and flow of the blood-stream was first conceived for the pulmonary circulation, this was the last part of the vascular system to be studied systematically.

The Greeks, although handicapped by religious and sentimental objections to human dissection, possibly knew of the circulation. But it was at the school of medicine established in Alexandria in the third century B.C., where the study of dead human bodies was encouraged, that Herophilus first gave the name of "artery-like vein" to the pulmonary artery and "vein-like artery" to the pulmonary vein, descriptions which persisted until Harvey's time. Erasistratus (about 290 B.C.) nearly discovered the circulation, but he thought that the arteries contained air. Galen proved that the arteries contained blood, but he thought that the passage of the blood to the tissues was by ebb and flow, and that the two ventricles communicated with each other through invisible pores.

The embargo on human dissection was later enforced by the Christian and Mohammedan religions and hindered progress for centuries. Servetus is generally supposed to have been the first to publish a description of the "pulmonary passage," but he was anticipated by an Arabian teacher three centuries earlier. The history of this discovery is worth noting.

IBN-AN-NAFIS

In 1924 an Egyptian medical student, Mohyi-el-Din-el-Tatawi, from Tanta in Egypt, presented as a thesis for his M.D. degree at the Albert Ludwig University of Freiburg-im-Breisgau an account of an Arab physician, Al Qurishi, generally known as Ibn-an-Nafis. Two years previously he had found at the Prussian state library in Berlin a copy of Ibn-an-Nafis's commentary on the Canon of Avicenna, written in the thirteenth century, and interpolated in this religious work was a description of the pulmonary circulation.

Haddad and Khairallah (1936) translate the passages as follows:—

"Whereas one of the functions of the heart is the creation of the spirit from very thin blood strongly miscible with air, and air, so it is necessary to make in the heart very thin blood to make possible the creation of the spirit from that mixture. The place where the spirit is created is in the left cavity of the two cavities of the heart. Therefore, it is necessary in the heart of man and his like—of those who have lungs—to have another cavity where the blood is thinned to become fit for mixing with the air. For if the air is mixed with the blood while it is still thick, it would not make a homogeneous mixture. This cavity (where the blood is thinned) is the right cavity of the two cavities of the heart. If the blood is thinned in this cavity it must of necessity pass to the left cavity where the spirit is created. But between these two cavities there is no passage, as that part of the heart is closed and has no apparent openings as some believed and no non-apparent opening fit for the passage of this blood as Galen believed. The pores of the heart there are obliterated and its body is thick, and there is no doubt that the blood when thinned passes in the vena arteriosa to reach the left cavity of the heart; having mixed with the air and become fit for the creation of the spirit. What is left of this mixture, less attenuated, the lung uses for its own nourishment. This is the reason why the vena arteriosa is made of thick walls and of two coats, so that what passes through its pores be very thin, and the arteria venosa thin and of one coat."

"The need of the lung for the vena arteriosa is to transport to it the blood which has been thinned and warmed in the heart, so that what seeps through the pores of the branches of this vessel into the alveoli of the lung may mix with what there is of air therein and combine with it, the resultant composite becoming fit to be spirit when this mixing takes place in the left cavity of the heart. The mixture is carried to the left cavity by the arteria venosa."

Since dissection was forbidden, the Arabians contributed little to anatomy, physiology or pathology. This makes the original views of Ibn-an-Nafis all the more notable. Although he covertly hints that he performed dissection, he states that he did not do so, but relied on the words of those who preceded him, especially Galen. It is remarkable that his conception was neglected and forgotten, but this is probably due to its heretical and original character and to the fact that Ibn-an-Nafis was a heretic—what would now be called a Unitarian.

THE ITALIANS AND HARVEY

No further accounts of the pulmonary circulation appeared until Servetus's description in book 5 of the Christianismi Restitutio, which has been translated by Foster (1901). Here again the description was interpolated in a heretical religious work; it was secretly printed in Vienna in 1553. Only two complete copies now remain, one in Paris and one in Vienna, though there is one incomplete copy in Edinburgh. We do not know how Servetus reached his remarkable conclusions—some have even suggested that he knew Arabic and revived the views of Ibn-an-Nafis—but I can see no reason to minimise his position as a genuine precursor of Harvey, though there is little doubt that Harvey was not aware of his opinions.

The pioneer of anatomical study, however, was Vesalius, whose De Fabrica was published in 1543. The destruction of his notes makes it a matter of speculation why, having disproved the Galenic anatomy of the heart, he did not overthrow Galen's theories about its function. Michael Foster suggests that Vesalius thought it might be dangerous to contest them. The immediate successor of Vesalius was his pupil and assistant, Realdus Columbus, who had a clear conception of the pulmonary circulation and brought forward clinical, experimental, and anatomical evidence in support of his views.

Cæsalpinus also seems to have recognised the pulmonary circulation and even to have conceived the possibility of a systemic movement of the blood in a sense different from that described by Galen. He has been acclaimed by some as the discoverer of the circulation, a claim disproved by Sir Edward Sieveking in his Harveian oration of 1877. Fabricius ab Aquapendente, whom Harvey describes as "a most skillful anatomist and venerable old man," returned,

* Abridged from the Harveian oration delivered to the Royal College of Physicians of London on Dec. 15, 1939.

if not to Galen's anatomy of the heart, certainly to his physiology of the heart and lungs. In his "De Respiratione et ejus instruments," published in the early years of the 17th century he wrote:—

"In breathing, Nature puts before herself mainly a double goal, the generation of the animal spirits, and the regulation and conservation of the heat of the heart. The heat is maintained and regulated by the supply of material, by refrigeration, and by getting rid of superfluous residues. All these things are brought about by means of the air taken into the body, whence the necessity of breathing."

Such was the confused state of opinion about the functions of the heart and lungs when Harvey returned to England in 1602, after his wander years at Padua. Harvey was puzzled that the same amount of blood should be sent to the lungs at each systole as was sent to the whole of the rest of the body, for it was obviously much greater than the amount necessary for the nutrition of the lungs. He dissected and studied more than eighty different kinds of animals. He mentions twice that animals without lungs have no right ventricle, and writes: "It may be said that the right ventricle is made for the sake of the lungs, and for the transmission of blood through them, not for their nutrition."

The problems of respiration and the changes induced by it in the blood were of great interest to him, and he speculated concerning the communication between the arteries and veins. In his letter to P. M. Slegel, dated March 26, 1651, he described his perfusion experiments on the heart and lungs of a man who had been hanged, conclusively demonstrating that the blood from the pulmonary artery reached the left ventricle, and that there was no direct communication between the two ventricles. He adds almost exultingly: "You may try this experiment as often as you please; the result you will find to be as I have stated it."

AFTER HARVEY

Four years after Harvey's death the capillaries were discovered, and the movements of the blood seen in those of the lungs, by Malpighi, whose discoveries and views on the functions of the lungs are propounded in his De Pulmonibus: There is an almost naïve sense of wonder and exaltation as he describes the blood flowing in different directions in the arteries and veins of the lung of a frog, as seen through a compound microscope. He suggested that the placenta acts vicariously for the lungs in the fœtus, and said that: "The lungs are made by Nature as if for a storehouse of blood, so that it may constantly in turns give forth blood to the heart, which thence driven into the whole body by continual circulation, may impart life and motion to everything."

The most important researches into the functions of the lungs and the pulmonary circulation came from the physicochemical side and stand largely to the credit of British observers. Boyle by his air-pump experiments in 1666 showed that air was essential to life. In the next year Hooke proved that the main object of respiration was to supply air to the blood. Lower, in 1669, demonstrated that the difference between arterial and venous blood was the change of colour, that this was due to the air in the lungs, and that the change took place in the lungs and not in the heart. In 1688 Mayow recognised that only part of the air, his "spiritus nitro-aereus," was necessary to life. Black, in 1757, rediscovered the "gas Sylvestre" of van Helmont, which he called "fixed air," now known as carbon dioxide. Priestley, in 1774, rediscovered oxygen, which he called "dephlogisticated air." Lavoisier recognised the true nature of Priestley's "dephlogisticated air" in 1777 and called it "acidifying principle or oxygen." He demonstrated for the first time that in the process of respiration the inspired air lost oxygen and gained the "fixed air" of Black, which was a compound of carbon and oxygen. Spallanzani discovered tissue respiration, and Magnus confirmed and established its nature.

The study of the physics of the circulation languished after Borelli until Stephen Hales, the clergyman-physiologist of Teddington, recorded his experiments on blood-pressure in the horse, sheep, and dog in 1733. He measured the rate of flow in the capillaries of the lungs of a frog by direct observation, and suggested that the blood must traverse the lungs with "vastly greater rapidity than through other parts of the body." Although he could not measure the pulmonary blood-pressure directly, he deduced that the thinner walls of the right ventricle indicated that it had less work to do in forcing the blood through the lungs than the left ventricle had in maintaining the systemic circulation. There was then little advance till Hope in 1839 described the symptoms and signs of cardiac insufficiency. He differentiated the effects of failure of the right ventricle from those of the left. Though long neglected, his work is now one of the landmarks in the study of the physics of the circulation.

ANATOMY OF THE PULMONARY BLOOD-SUPPLY

Miller (1937) points out that the pulmonary artery in branching follows the subdivisions of the bronchial tree. The pulmonary veins, on the other hand, do not accompany the bronchi and are placed as far from them as possible. The bronchial arteries vary in number and in place of origin. In the lungs they enter the peribronchial connective tissue and divide with the bronchi as far as the smaller bronchioles, where they cease. There is no anastomosis between the pulmonary and bronchial arteries, but there is direct communication between the capillary systems, and the blood from the bronchial artery is in part returned by the pulmonary veins. Miller has shown that the bronchial arteries also supply the vasa vasorum of the pulmonary artery. Berry, Brailsford and Daly (1931) confirm, from experiments on animals, that there is a functional anastomosis between the two systems, but only through the capillaries, and say that changes in bronchial arterial pressure can lead to changes in pulmonary arterial pressure and pulmonary venous flow.

There are no valves in the pulmonary veins; but the supply of blood to the right side of the heart is greatly aided by the valves of the jugular and subclavian veins and the veins of the legs in maintaining the filling of what Keith has called "the venous cistern." This comprises the superior and inferior venæ cavæ and the innominate, iliac, hepatic, and renal veins, the total capacity of which he estimates as 400–500 c.cm. The cistern is subject to the aspirating effects of the inspiratory movements and is fed by the pumping or "milking" action of the limb muscles.

GASEOUS EXCHANGES IN THE PULMONARY CIRCUIT

There are about 700,000,000 alveoli in the human lungs, and the blood is exposed to alveolar air over an area of 90 sq. m. (about 1000 sq. ft.). The surface to which the 3000 c.cm. of air in the moderately distended lungs is exposed is clearly enormous. Maximow estimates that the total area of the capillaries in the alveolar walls is 140 sq. m. These figures are only approximate, but they give some idea

of the possibilities of exchange between the blood in the capillaries and the alveolar air. At rest in man about 250 c.cm. of oxygen is absorbed and about 200 c.cm. of carbon dioxide given out each minute. Loewy and Zuntz calculate that under the conditions of gas pressure in the lungs 6100 c.cm. of oxygen could be absorbed per minute, which illustrates one aspect of the enormous margin of safety of the pulmonary functions.

The efficiency of the mechanism for gaseous exchange is further shown by the fact that during exercise venous blood may contain only 5 c.cm. of oxygen and up to 65 c.cm. of carbon dioxide per 100 c.cm.; in arterial blood coming from the lungs the gaseous content is restored to the levels in the resting state, although the blood is in the pulmonary capillaries only one second or less, during which brief time it becomes 95 per cent. saturated with oxygen. With violent muscular exertion the gaseous exchange is increased tenfold or more, so that there must be some rapidly acting adjustments by which more blood can be passed through the lungs and exposed to the alveolar air when necessary. At the height of inspiration the lungs contain about a twelfth of the total blood of the body; in expiration this is reduced to a fifteenth or even an eighteenth, while with increased heart-rate the amount may reach as much as a fifth. An even more striking illustration of the adaptability of the pulmonary circuit is afforded by the variations in cardiac output. At rest the stroke volume of the heart is about 70 c.cm. and the output per minute about 5 litres; this may be increased on exercise to 30 litres. Since the total volume of blood in man is roughly 5 litres, the heart can circulate this full amount six times a minute when the activities of the body demand it, a remarkable tribute to its efficiency as a pump.

Experimental and microscopical evidence has been brought forward in the last fifteen years to support the contention that the lungs may act as a blood depôt. Barcroft defines a blood depôt as an organ which can, and at times does, contain a large quantity of blood capable of being diverted for use elsewhere. Howell and Donahue (1937) have shown that the blood in the pulmonary artery is richer in blood platelets than that brought to the lungs by the pulmonary veins. They have found megakaryocytes in the lung tissue and thus demonstrated another function in which the lungs seem to act reciprocally with the spleen. Other activities accredited to the lung are the capacity to destroy lactic acid (Eppinger) and a part in the metabolism of fat (Roger).

MECHANICS OF THE PULMONARY CIRCULATION

Wiggers (1937) estimates the normal systolic pressure in the pulmonary artery as 60–32 mm., with an average of 44 mm. Hg, and diastolic pressure 21–6 mm., with an average of 12 mm. Hg. The pulse pressure is therefore about 30–34 mm. Hg. The average pressure in the pulmonary artery is about a sixth of the aortic pressure. The pressure in the pulmonary veins at their junction with the left auricle is assumed to be at or near atmospheric pressure and certainly slightly more than that in the auricle. The capillary pressure is also a matter of assumption; it must be less than the minimal diastolic pressure of 5 mm. and is probably 3–5 mm. Hg. The short course of the pulmonary artery and of its two divisions, the rapid subdivision of the intrapulmonary branches to form a quickly widening course on the arterial and capillary side, and the shorter extent of the whole circuit explain the lower pressures and greater velocity of the blood in the pulmonary circulation. Wiggers points out that variations in pulmonary pressures depend on the output of the right ventricle, the changes in resistance and capacity in the pulmonary circuit, and back pressure from the left side of the heart. Back pressure is now accepted by cardiologists as an important factor in circulatory failure.

In health the output of the two ventricles per beat must be equal, except for brief periods of adjustment; the systemic circulation can only be effective if the left ventricle is adequately supplied from the lungs; and the right ventricle can only deliver the varying quantity needed if the venous return is effective and adequate, which in turn depends chiefly on the efficiency of the systemic circulation, the vis a tergo. Adequate filling of the right side of the heart is therefore essential for an efficient circulation; in other words, it is the right or weaker side of the heart which calls the tune and sets the pace.

An important factor in the adjustment of the two circuits is the great capacity of the lungs to accommodate extra blood, storing it temporarily and passing it on to the left side of the heart as needed. Ligature of one pulmonary artery causes only a temporary rise of pulmonary pressure, and the other lung can almost at once deal with the blood that formerly went to both, a fact of vital importance in lobectomy or unilateral pneumonectomy. Dunn has shown, too, that considerable areas of the pulmonary circulation can be blocked by artificial emboli with no more than a temporary fall of pulmonary blood-pressure.

Blumgart (1931) and his associates have studied the time-relations of the pulmonary circulation. The total circulation-time from arm to arm is 12–24 sec., with an average of 18 sec. The time from arm to heart is 2–14 sec., with an average of 6⅔ sec., and the "crude pulmonary time" is 5–17 sec., with an average of 10⅛ sec. The pulmonary time is greatly increased in cases of pulmonary venous engorgement.

CONTROL OF THE PULMONARY CIRCULATION

Since the heart is a double pump maintaining two separate yet mutually dependent circuits, the two essentials for its efficient action must be adequate filling of the right ventricle and effective force of the heart muscle, each regulated to supply the varying needs of the organs and tissues. Mechanical factors play an important part in the regulation. The filling of the right side of the heart depends on an adequate pressure in the great veins. This pressure depends on the force of the left ventricle transmitted through the capillaries and veins, aided by the effect of the respiratory movements on the intrathoracic pressures—what Leonard Hill has called "the respiratory pump." There is a slightly delayed rise of the systemic blood-pressure with inspiration; but the pressure in the pulmonary artery falls with inspiration because, according to Sharpey-Schafer and Daly, of the diminished peripheral resistance in the lung when it is moderately expanded. Cloetta explains this as being due to the radial traction of the alveoli on the vessels.

Variation in the degree of filling of the right side of the heart is the chief factor in adjustment, alteration in the rate of the heart being secondary to it and effected by reflex nervous mechanisms. In early diastole filling is rapid, because the pressure in the ventricle as it relaxes is low; then there is a period of slower entry of blood, because the pressures in the veins and ventricle are nearly equal; then there is the short auricular systole which is said to be responsible for 20–35 per cent. of the ventricular contents. It is now generally accepted that the rhythm of the

heart is myogenic, and that the pace-maker is the sino-auricular node.

Nervous factors are complex and for the most part automatic, being brought into play chiefly by the changes of pressure in the heart and in the vessels. In 1915 Bainbridge demonstrated that increased pressure in the right auricle brought into action a reflex mechanism accelerating the heart-rate. The acceleration arises largely from diminished vagal inhibition, but also partly from increased cardio-accelerator action. A corresponding mechanism on the systemic arterial side was demonstrated by Hering, in 1924, who showed that increase in the pressure in the carotid sinus caused slowing of the heart and a fall in blood-pressure, partly from increased vagal inhibition and partly from diminished accelerator action. Similar reflexes are activated by changes of pressure in the aorta and in the heart itself. These are believed to be put in action by "stretch receptors" in these situations, the afferent paths being through the glossopharyngeal and depressor or aortic nerves. This is the basis of Marey's law, enunciated in 1859, that a rise of blood-pressure tends to slow the heart. Recent researches by Heymans and other Belgian investigators indicate that changes in blood-pressure can by similar reflex paths in these same nerves influence the rate of respiration, a fall of blood-pressure stimulating respiration.

The lungs were supposed to have no vasomotor nerves until Brown-Séquard, in 1871, demonstrated their existence. There seems no doubt now that there is a definite and effective vasoconstrictor supply through the sympathetic system. Hochrein and Keller suggest that its chief use is to serve the "shunt" activities of the pulmonary vessels as regards its function as a reservoir or "depôt." The existence of vasodilators is still in doubt, though there is evidence of a parasympathetic supply of this nature. The pulmonary capillaries are not passive tubes. They undergo active changes in calibre, as observed by Krogh (1929). It was at first supposed that these variations were due to the contractile cells in the capillary walls described by Rouget in 1873. Changes in surface tension in the capillary walls have also been regarded as responsible. These explanations are doubtful, and evidence is accumulating that the changes are due to nervous and chemical control. Little is known of vasomotor supply to veins, but there is reason to believe that they have a vasomotor supply, and that they may be influenced by the reflex mechanism of the carotid sinus.

Chemical regulators.—The suggestion that the action of the vasomotor nerves might be due to an adrenaline-like substance liberated at the nerve-endings was made by T. R. Elliott in 1904. Cannon subsequently called the substance sympathin. Loewi, in 1921–26, extended this conception of humoral transmission, and it has been studied in this country by Dale and his collaborators. The sympathetic endings are activated by an adrenaline-like substance and are therefore called adrenergic, whereas the parasympathetic endings and the motor nerve-endings in voluntary muscle are susceptible to acetylcholine and are therefore called cholinergic. It is difficult to determine the effects of adrenaline and acetylcholine on the pulmonary vessels, because of their coincident effects on the heart and the systemic and coronary vessels. Adrenaline can constrict the pulmonary arterioles and raise the pressure in the pulmonary artery, but it can sometimes produce dilatation, though this effect is apparently more obvious in the capillaries. The action of acetylcholine varies with the dose, the vessels dilating with small and constricting with large doses. Histamine, which is normally present in the lung, constricts the pulmonary vessels and dilates the systemic.

Although the two circulations depend so closely on each other, the arterial pressures in them are remarkably independent in health. Considerable rises can take place in the systemic arterial pressure with little or no effect on the pulmonary pressure, and the lungs can undoubtedly protect the left side of the heart from overdistension by shunting large quantities of blood into the pulmonary veins and capillaries. It is only when the left ventricle fails that the back-pressure effects become serious, increasing the pulmonary pressures and decreasing the velocity of flow, while increasing the contractions of the right ventricle and engorging the lung.

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DR. LISLE PUNCH: LEGENDS TO ILLUSTRATIONS

(*see opposite page*)

I—Radiograms of normal chest: (*a*) anteroposterior; (*b*) lateral: lines *a* indicate the position of the normal right middle lobe, and lines *b* that of a completely collapsed middle lobe.

II—Radiograms showing pneumonic consolidation of right middle lobe (case 1): (*a*) anteroposterior; (*b*) lateral.

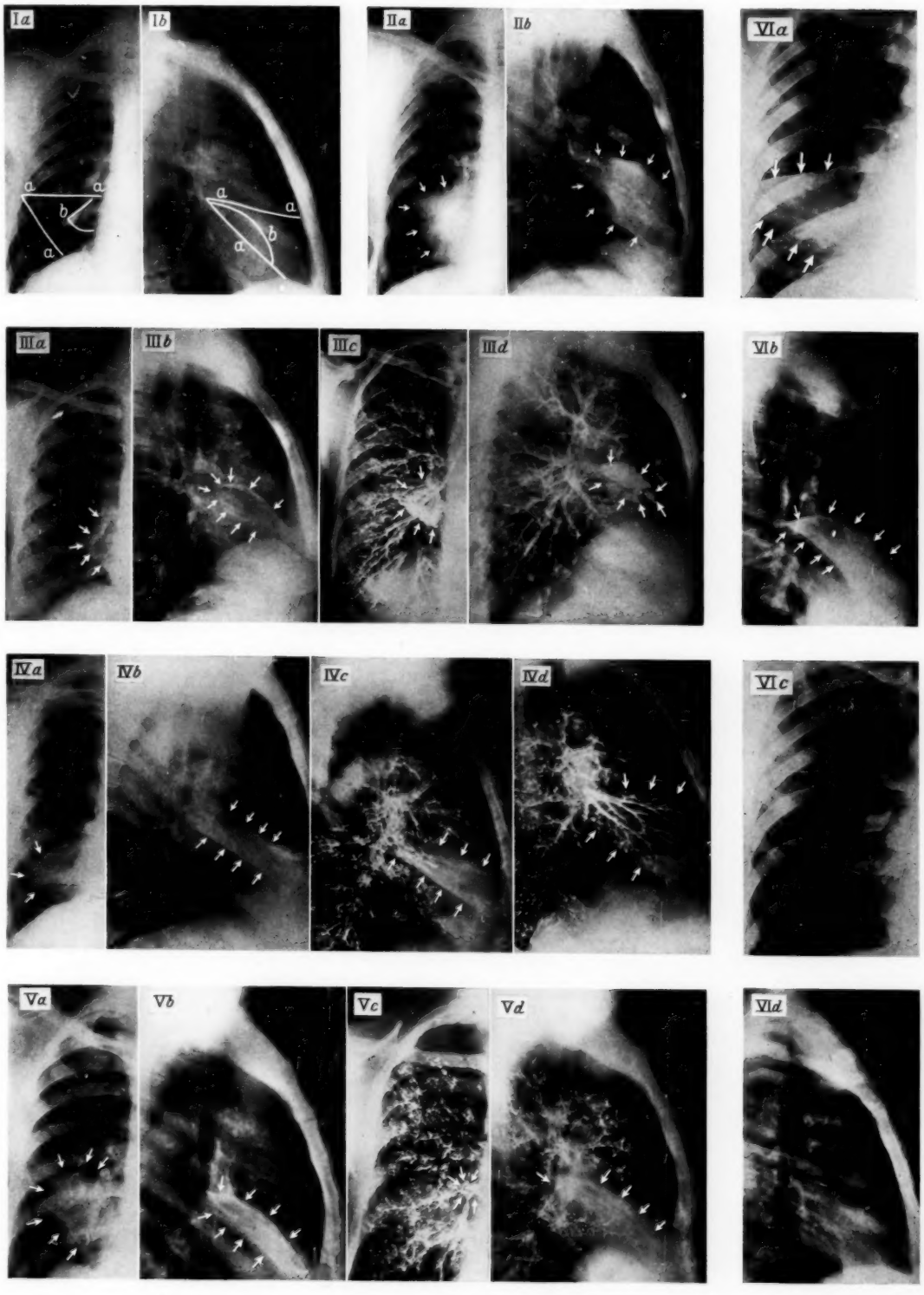
III—Radiograms showing bronchiectasis in collapsed right middle lobe (case 2): (*a*) anteroposterior; (*b*) lateral, showing honeycombed appearance; (*c*) anteroposterior bronchogram showing saccular dilatation of bronchi; (*d*) lateral bronchogram.

IV—Radiograms showing opacity in right lower zone due to massive collapse of right middle lobe caused by obstruction of the bronchus by a plug of mucus (case 3): (*a*) anteroposterior; (*b*) lateral; (*c*) anteroposterior bronchogram showing irregularity of filling at the site of origin of the bronchus to the right middle lobe; (*d*) lateral bronchogram showing collapse of the right middle lobe. The opaque medium has only entered a short distance into the bronchi of the middle lobe.

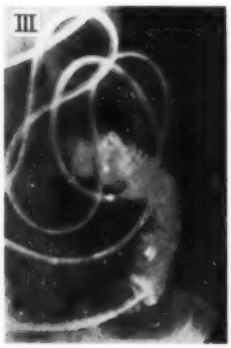
V—Radiograms showing opacity in right lower zone due to collapse of the right middle lobe caused by obstruction of the bronchus by a malignant tumour (case 4): (*a*) anteroposterior; (*b*) lateral radiogram showing typical appearance of collapsed right middle lobe; (*c*) anteroposterior bronchogram (the site of obstruction is marked by arrows, and the bronchi outlined by opaque medium in the lower zone belong to either the upper or the lower lobe); (*d*) lateral bronchogram.

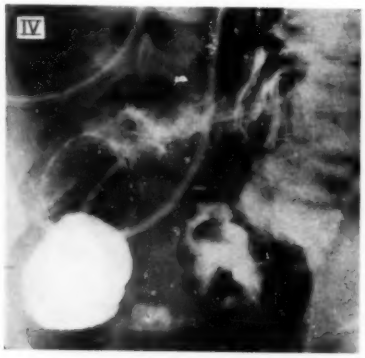
VI—Radiograms showing opacity in right lower zone due to an interlobar collection of fluid (case 5): (*a*) anteroposterior; (*b*) lateral; (*c*) anteroposterior; and (*d*) lateral five months later, showing absence of opacity seen in (*a*) and (*b*).

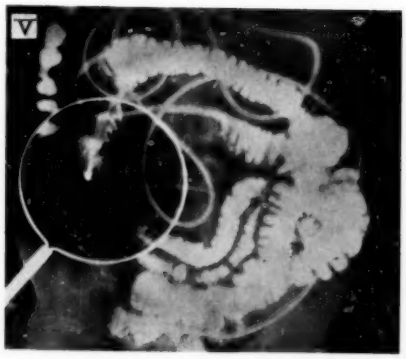
DR. PUNCH: DISEASES OF THE RIGHT MIDDLE LOBE



DR. BOON: INTUBATION OF THE SMALL INTESTINE







DISEASES OF THE RIGHT MIDDLE LOBE OF THE LUNG

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(WITH ILLUSTRATIVE PLATE)

THE more precise technique in radiography of the chest, including lateral and oblique views besides anteroposterior, together with the introduction of bronchography and tomography, has led to a greater degree of accuracy in the localisation of pulmonary lesions. One of the many interesting facts that have emerged from these advances in diagnostic radiography is the frequency with which a variety of diseases may originate in and often be entirely confined to the middle lobe on the right side. The object of this communication is to describe instances of five different pathological conditions affecting this region of the lung and at the same time to refer briefly to the chief points in the differential diagnosis of each of them.

ANATOMY OF THE MIDDLE LOBE

The middle lobe of the right lung is a small wedge-shaped piece of lung lying between the lesser fissure and the lower part of the greater fissure. In an anteroposterior radiogram the area of the picture in which the middle lobe lies can be marked out by drawing a line from the mid-sternal line at the level of the fourth costal cartilage horizontally outwards to the lateral margin of the thorax and joining the outer end of this line to a point on the sixth rib in the mid-clavicular line (fig. I*a*). In the lateral radiogram the middle lobe can be marked out by drawing a line horizontally from the sternum at the level of the fourth costal cartilage backwards to approximately the centre of the radiogram and joining the central end of this line to a point on the diaphragm about 2 in. behind the sternum (fig. I*b*). The middle lobe lies between these two lines. It is clear that an opacity seen in the anteroposterior radiogram in the area defined by the white lines in fig. Ic may either be in the middle lobe or the lower part of the lower lobe and it is only by a lateral view that it can be determined in which of the two such an opacity lies.

RADIOGRAPHIC APPEARANCES OF COLLAPSED MIDDLE LOBE

Three of the conditions to be described may be associated with collapse of the middle lobe, resulting from obstruction of the bronchus to it. Such a collapsed middle lobe may not cause any abnormal physical signs, because as it collapses it recedes from the chest wall and becomes covered up in front by the upper lobe, which undergoes compensatory emphysema. Since, therefore, the diagnosis of collapse of the middle lobe has often to be made on radiological evidence only, it is important to be able to recognise the shadow that it produces in the radiogram. When the bronchus to the middle lobe becomes obstructed, the middle lobe collapses inwards and backwards. The greater fissure, which forms the posterior border of this lobe, remains stationary, and the lesser fissure is shifted inwards, downwards, and backwards. The area in the radiograms which the opacity resulting from a collapsed lower lobe occupies is indicated by the lines *b* in fig. I. In the anteroposterior radiogram it is a small triangular area close to the right border of the heart, well internal to the lateral margin of the chest and above and at no point reaching down to the diaphragm. In the lateral radiogram it is a somewhat oval area in the centre of that portion of the radiogram normally occupied by the middle lobe. It will thus be seen that when this lobe collapses it recedes both from the anterior and lateral parts of the chest wall and so becomes deeply situated in the thorax and out of reach of physical examination. The upper lobe enlarges by compensatory emphysema to fill up the intrathoracic space previously occupied by the fully aerated middle lobe. It is worthy of note that collapse of this lobe does not cause that displacement of the heart to the same side which is almost invariably associated with collapse of the lower lobe.

The above description applies to the appearances seen in complete collapse of the middle lobe. Partial

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DR. BOON: LEGENDS TO ILLUSTRATIONS

(*see opposite page*)

III—Intubation of normal bowel. Barium emerged about 5 in. behind the tip of the tube. Although a small amount was regurgitated, the main mass of barium lies beyond that point.

IV—Case 1 (regional ileitis). Balloon reinflated to prevent regurgitation of barium. There is a pool of barium beyond it, which slowly leaked into an irregular and irritable terminal ileum, which could not be filled with barium.

V—Case 2 (regional ileitis). Much regurgitation along the tube, the tip of which is in the centre of the pressure cone. Where the bowel extending from the tip of the tube crosses the left border of the spine there was a persistent narrowing under all conditions. This figure and fig. IX appear on the plate as the mirror-images of their true appearance.

VI—Case 3 (adhesions in the immediate vicinity). Injected air marks the tip of the tube, and in the adjacent loop of bowel persistent narrowing can be seen.

VII—Case 4 (adhesions in the immediate vicinity and numerous tubercles along the terminal ileum). (*a*) The balloon was accidentally left inflated. It was arrested in the same situation on each of three intubations, and the angulation was demonstrated on the first two intubations but not found at operation. The tip of the loop was tender, and the loop could be opened out but resumed its shape even after deflation of the balloon and withdrawal of the tube. (*b*) Same case after partial withdrawal of the tube.

VIII—Case 5. Angulation in the left upper quadrant which could not be opened out but was freely mobile. The balloon could not pass this point when almost completely deflated. The ileum between this point and the cæcum was irregular.

IX—Case 6 (Previous appendix abscess). The tip of the tube has fallen back into a healthy segment of bowel on deflation of the balloon. Barium passed from this loop into the area encircled by it, and then into a normal-looking segment to the right of the first loop. The central area was irregular, and barium remained in it long after the normal loops had emptied.

X—Case 7 (Previous appendicectomy and suspension of uterus). Radiogram 25 min. after injection of barium. The tip of the tube marks a narrowing in the bowel. Considerable regurgitation is demonstrated in the bowel, which appears to be very active, despite which the area beyond the narrowing is incompletely filled.

atelectasis produces an opacity of less density and occupying a position intermediate between that of the fully collapsed and the fully aerated middle lobe.

LOBAR PNEUMONIA

Acute lobar pneumonia may originate in the right middle lobe and may remain confined to it or subsequently spread to other lobes. In the following case the disease started in the middle lobe and later involved the whole of the right lung.

CASE 1.—A man, aged 59, had had a cough for several years. He had experienced a pain in the upper part of the right side of the chest on deep breathing for one day, during which time he had coughed up some blood-streaked sputum. No loss of weight. Temperature 97·2° F., respiration-rate 22, and pulse-rate 88. An anteroposterior radiogram (fig. II*a*) showed a dense opacity in the lower zone, which in the lateral radiogram (fig. II*b*) was seen to occupy the area of the middle lobe. The appearances suggested consolidation. A bronchial neoplasm was thought of, but against this was the fact that there did not appear to be any collapse of the lobe. The patient was not acutely ill (he had come by 'bus some miles to hospital) and was therefore sent home to await admission to hospital for further investigation.

Two days later I was rung up and asked to go and see this patient in his home, for he was said to be acutely ill. I found him very ill with a temperature of 103·4° F., respiration-rate 44, and pulse-rate 124. He was very dyspnœic, the alæ nasi were working, his face was flushed, and his whole appearance was typical of acute pneumonia. Physical examination revealed the signs of consolidation over the whole of the right lung. A radiogram showed a dense opacity over the whole of the right side of the chest, suggesting consolidation. After a protracted illness the patient eventually made a complete recovery, with resolution of the pneumonic consolidation.

BRONCHIECTASIS IN COLLAPSED MIDDLE LOBE

The recognition of bronchial dilatation in collapsed lobes has only been recognised as a clinical entity since the introduction of bronchography as a method of investigation in pulmonary diseases. This pathological condition is most often seen in one or other of the lower lobes but may also affect and be entirely confined to the right middle lobe.

CASE 2.—A woman, aged 35, had had attacks of pleurisy in 1925, 1933 and 1936. She first began to cough three months before attending hospital. No sputum. No hæmoptysis. Some lassitude. Dyspnœa on exertion. Physical examination revealed no abnormal signs in the chest. A trace of sputum was obtained after admission to hospital and was negative for tubercle bacilli on three occasions.

An anteroposterior radiogram of the chest showed a triangular non-homogeneous opacity in the lower zone (fig. III*a*), which in the lateral radiogram was seen to lie anteriorly in the position of the middle lobe (fig. III*b*). The lesser fissure is low in position, suggesting collapse of the middle lobe, and the opacity has a somewhat honeycombed appearance indicating dilatation of the bronchi within it. The bronchograms (figs. III*c* and *d*) show clearly the bronchiectasis in the collapsed lobe; they also demonstrate very well that the diseased area of the lung is at no point in contact with the chest wall and so provide an explanation of the absence of abnormal physical signs.

This case offers a good example of silent bronchiectasis—i.e., bronchiectasis without sputum. Localised dilatation of the bronchi in the middle lobe without any collapse of the lung is also by no means uncommon. This condition is easy to miss, for not only are there often no abnormal physical signs but also the straight radiogram may show very little abnormal save perhaps slight increase in the linear striation in the region of the middle lobe. Most of the cases with which I have personally met have been detected by routine bronchograms taken in the investigation of cases of slight hæmoptyses in which no evidence of tuberculosis could be found.

The ætiology of bronchiectasis in collapsed middle lobes is not fully understood. Three theories have been put forward: (1) that it is a sequel to pneumonia; (2) that it is congenital—i.e., that the bronchiectasis develops in atelectatic lobes that have never expanded since birth; and (3) that it is a result of pressure on the bronchus by enlarged mediastinal glands. It is probable that all the cases have not a common ætiology, but that one or the other of the above causes operates in different cases.

MASSIVE COLLAPSE

Massive collapse of a lobe of the lung resulting from obstruction of the bronchus to it by mucus is a well-recognised postoperative phenomenon. It may also develop in a variety of other conditions. In a few cases a bronchus may become occluded by mucus with no history of any preceding illness to account for it. The lower lobes are most often involved in this type of massive collapse, especially in the postoperative cases, but occasionally the right middle lobe is alone affected. The following is an example of obstruction of the bronchus to the middle lobe by mucus from no apparent cause, with resulting collapse of that portion of the lung.

CASE 3.—A man, aged 40, with no history of any previous illnesses, was first seen by me on Dec. 9, 1938, when he gave a history of sudden onset of pain in the right side of the chest on Nov. 6, which had persisted. Since that date he had had a slight cough, mostly in the morning and at night, with scanty mucoid sputum, which had been streaked with blood on one occasion early in December. He had also experienced some shortness of breath on exertion.

No abnormal physical signs could be detected in the chest, and the sputum was negative for tubercle bacilli on four occasions. A radiogram of the chest in the anteroposterior position (fig. IV*a*) showed an opacity in the lower zone on the right side, which in the lateral position (fig. IV*b*) is seen to lie anteriorly, suggesting collapse of the middle lobe. The bronchogram in the anteroposterior position showed some irregularity of filling at the site of origin of the bronchus to the middle lobe. The lateral bronchogram (fig. IV*c*) confirms the suggestion that the opacity seen in the straight radiogram was due to a collapsed middle lobe and shows that the opaque medium has only entered a very short distance into the bronchi of this lobe.

In view of the man's age, the symptoms, and the radiological appearances a bronchial carcinoma was strongly suspected. I therefore asked Mr. F. C. Ormerod to perform bronchoscopy. He found the larynx and carina normal. There was a plug of mucus occluding the bronchus of the right middle lobe. This was aspirated, revealing a normal hiatus which was unobstructed by growth or anything else. A second bronchogram (fig. IV*d*) showed that the middle lobe had re-expanded, and that its bronchi were filled normally by the opaque solution. A further bronchogram, taken some four months later, again showed a perfectly normal middle lobe.

This case illustrates the extreme importance of bronchoscopy in all cases where a bronchial carcinoma is suspected, however definite the radiological appearances seem, before a positive diagnosis is made.

BRONCHIAL CARCINOMA

Bronchial carcinoma appears now to be very common. The commonest site of its origin is in one of the main bronchi, 1–2 in. beyond the bifurcation of the trachea. It may, however, arise anywhere in the bronchial tree and by no means uncommonly in the branch to the right middle lobe.

CASE 4.—A man, aged 61, had had "influenza" in April, 1938. Cough and sputum had persisted since. Sputum occasionally bloodstained. From April to October, 1938, when I first saw him, the patient had lost 1 st. 5 lb. He also complained of considerable lassitude, with pain at the right side of the chest.

On examination no abnormal physical signs could be detected in the chest. The sputum was negative for tubercle bacilli. A radiogram of the chest showed an opacity in the lower zone on the right side (fig. V*a*), which in the lateral view was situated in the region of the middle lobe and suggested consolidation and collapse (fig. V*b*). An anteroposterior bronchogram shows that the bronchus to the middle lobe is obstructed (fig. V*c*), and this is confirmed by the lateral bronchogram (fig. V*d*), which shows that none of the opaque medium has entered the middle lobe, which is collapsed.

INTERLOBAR EFFUSION

A collection of fluid in the lesser fissure of the lung may cause an opacity in the radiogram in the region normally occupied by the right middle lobe.

CASE 5.—A male, aged 30, had had "heart weakness" since the age of 13. For six weeks the patient had complained of a persistent cough, with 2 oz. of yellow sputum a day, and of some pain in the back and shortness of breath on exertion. On examination the heart was found to be considerable enlarged, and there were signs of aortic and mitral valvular lesions. There was evidence of slight congestive heart failure.

A radiogram of the chest showed that the heart was much increased in the transverse diameter. The lungs were congested in appearance. In the lower zone on the right side there was an opacity with a sharply defined upper margin (fig. VI*a*). A lateral radiogram showed that this opacity was situated in the region of the middle lobe (fig. VI*b*). The sharply defined upper margin of this opacity strongly suggests to me that it was due to a collection of fluid in the lesser fissure, and there is no doubt that such an effusion can produce this appearance in the radiogram. In this particular case the diagnosis was not confirmed by exploratory puncture of the chest. Radiograms taken five months later (figs. VI*c* and *d*) showed that the opacity had completely disappeared and the area in the region of the middle lobe was normally translucent. The signs of congestive heart failure were no longer present.

SUMMARY

(1) A variety of different pathological conditions may affect and often be entirely confined to the region of the right middle lobe of the lung. These include pneumonia, bronchiectasis, massive collapse, bronchial carcinoma, and interlobar effusion.

(2) Owing to the anatomical position of this lobe, especially when it is partially or completely collapsed, disease of it often produces few, if any, abnormal physical signs.

(3) The shadows produced in the straight radiograms, in both the anteroposterior and lateral views, by the pathological conditions enumerated above are often very similar in appearance. It is often only by further methods of examination, such as bronchography, bronchoscopy, and exploratory puncture of the chest, that a differential diagnosis between them can be made.

INTUBATION OF THE SMALL INTESTINE

DEMONSTRATION AND LOCALISATION OF PARTIALLY OBSTRUCTIVE LESIONS

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(WITH ILLUSTRATIVE PLATE)

SINCE the introduction by Miller and Abbott (1934) of intestinal intubation with a double-lumened tube and balloon, and of its employment by Abbott and Johnston (1938) in the treatment of obstruction, this method has been increasingly used and is now firmly established as a valuable and often crucial therapeutic procedure in cases of obstruction in which there is no progressive intestinal necrosis that demands immediate operation. The procedure not only permits decompression of the distended bowel, the restoration of body fluids and electrolytes to normal levels by the oral route, and the establishment of drainage from a point immediately proximal to the obstruction, but also it has often made it possible, by the injection of a relatively small amount of barium, to define the obstructing lesion and to decide at leisure on subsequent therapeutic measures.

Except for one patient recorded by Abbott and Johnston (1938) the published reports have dealt with its application in frank cases of obstruction. The investigation now described has been directed towards evaluating intubation as a method of demonstrating partial small intestinal obstruction due to narrowing, angulation, persistent spasm, or other local defects. An attempt was made to select cases in which partial obstruction might be demonstrated, and yet a perusal of the case-records will show that, although previous intra-abdominal pathology, the symptoms and signs, and the other special investigations suggested its presence, at the time of intubation convincing evidence was lacking as to its definite existence, situation, or character.

APPARATUS AND PROCEDURE

A standard Miller-Abbott tube (Miller and Abbott 1934), size 16 French, length 11 ft., was used. In all instances the balloon was mounted immediately behind the tip and connected with the smaller lumen. In cases 1 and 4 (first intubation only) the larger lumen communicated with the interior of the bowel only through the metal bucket (fig. I), but in all the others the larger lumen also contacted the intestinal contents through perforations immediately behind the balloon (fig. II). When suction was desired, it was obtained with a Wangensteen apparatus. Some of the intubations were carried out on outpatients; but, owing to the variability in rate of progress of the balloon, admission to hospital is preferable.

On reaching the second or third part of the duodenum of the fasting patient the balloon on the distal end of the tube was inflated with 30 c.cm. of air. More of the tube was then fed to the patient at the rate of 1–2 ft. an hour, and the patient was fluoroscoped at intervals of two to four hours to show the progress of the tip of the tube and to make sure that the tube was not coiling in the stomach. To encourage peristalsis and to facilitate passage of the balloon, the patient was given a low-residue diet from time to time and requested to move about.

When the balloon was arrested at one point in the abdomen for two hours or more (sometimes overnight), it was deflated, and barium was injected into the intestine. In case 1, owing to the unusually great tendency of the barium to regurgitate, the balloon was inflated before the final injection was made, and in case 2 the balloon was accidentally kept inflated while the injection was made at the first intubation.

Loefstrom and Noer have used barium in association with mineral oil, gum acacia, and water in demonstrating bowel lesions and found it advantageous to use a mixture of the highest viscosity that can be passed through the tube without difficulty. In this investigation a mixture of two parts of water to one of barium was found to be satisfactory.

As a result of carrying out the above procedure on healthy subjects, it has been my experience and that of Abbott (personal communication) that a balloon inflated with 30 c.cm. of air passes down the normal small intestine to the ileocæcal valve without becoming arrested for periods of two or more hours, and that barium injected en route passes on in the gut without appreciable regurgitation (fig. III). The amount of regurgitation is greatest when a small injection is slowly made, for a peristaltic wave is then least likely to be stimulated. At the ileocæcal valve there may be some delay before the inflated balloon passes through, and regurgitation may normally take place at that site. Abbott has observed that, when barium is injected in cases of complete obstruction, there is no appreciable regurgitation until the site of injection is immediately proximal to the obstruction.

CASE-RECORDS

CASE 1.—A Jew, aged 22, was well until December, 1938, when he began to have irregular bouts of loud abdominal rumblings, followed later by lower-abdominal pain, pyrexia up to 102° F., constipation, and loss of weight. After a time these symptoms disappeared, but he did not feel well, and in January, 1939, they all returned for a few days, when he noticed that, with the pain, small soft swellings appeared in the lower abdomen.

In March, 1939, he had another recurrence of the symptoms and was seen by Dr. T. Grier Miller, who diagnosed regional ileitis. He was then in poor general condition, with frequent loud gurglings, tenderness, and occasional soft palpable swellings in the lower right quadrant of the abdomen. Rectal examination, barium meal, and barium enema did not reveal any abnormality, except that the meal did not reach the cæcum until after four and three-quarter hours.

On intubation a week later, the balloon became arrested in the right lower quadrant, and the direct injection of a barium mixture showed a partially obstructive lesion suggesting regional ileitis (fig. IV). At operation the last 8 in. of the ileum was found to be the seat of regional ileitis, with considerable narrowing at one point and adhesions between two adjacent loops. The last 18 in. of the ileum and the ascending colon was resected, the tube first being drawn above the site of the anastomosis to prevent the bowel contents from reaching the raw area for a few days after the operation. The patient made a good recovery and was discharged three weeks later.

CASE 2.—A Jew, aged 67, began to have severe diffuse lower-abdominal pain in April, 1939. Abdominal examination showed only gaseous distension. Examination after a barium meal led to a diagnosis of partial obstruction of the small bowel in the right lower abdomen, believed to be due to adhesions, Meckel's diverticulum, or malignancy. On intubation the balloon passed very slowly and finally stopped; an injection of a barium mixture then showed narrowing of the lumen of the small intestine on the left side of the abdomen and several feet above the cæcum (fig. V).

At operation about 3 ft. of bowel, the lowermost point of which was 3 ft. from the ileocæcal valve, was found to be œdematous, reddened, and somewhat hæmorrhagic, and, as indicated by the intubation radiograms, there was a constriction. The appearance was that of regional ileitis; but, in view of the somewhat acute nature of the lesion, it was decided not to do a resection but to see if the condition would not improve spontaneously, which it eventually did. A mesenteric gland excised at the operation showed changes due to chronic inflammation.

CASE 3.—A female, aged 57, had complained of attacks of severe pain in the right upper abdominal quadrant for nine to ten months. These at first had been precipitated by a heavy meal, but finally the patient was able to eat only junket. Much weight had been lost. The past history included a cholecystectomy twenty years previously and an appendicectomy.

Radiography showed a tender pyloric end of the stomach, puddling of barium in the ileum, and lessened motility of the bowels. Some of the intestinal loops were gas-filled, and the various observations suggested that the patient had intestinal adhesions.

On intubation the balloon became arrested at the site of the upper right rectus scar, and an injection of barium at that point showed a persistent narrowing of the lumen of the small bowel. Regurgitation was little more than normal (fig. VI). The patient localised this point consistently when asked where her pain was.

At operation a band of omentum was found attached to the scar at the designated spot, but no obstruction of the bowel could be demonstrated. The band was divided, and postoperative progress was entirely satisfactory. It is possible, but unlikely, that a loop of bowel had been caught by the omental band at the time of the intubation, but more probable that spasm, to be discussed later, was responsible for the arrest of the balloon.

CASE 4.—A female German immigrant, aged 35, was seen in March, 1939, when she complained of cramping abdominal pain of nine years' duration, accompanied at times by attacks of fainting. Her previous history included an appendicectomy at 15 and prolonged treatment for pelvic inflammation. She was dirty and unkempt, with gross pharyngeal and sinus infection. On abdominal examination only some diffuse tenderness was noted. The uterus was retroverted and somewhat fixed, but no other abnormality was discovered on rectal examination. Routine diagnostic studies, including a fractional test-meal, a cholecystogram, a gall-bladder drainage, and a barium enema, gave negative results. Radiography after a barium meal likewise revealed nothing abnormal, except that "the impression was gained that there was some disturbance in the terminal ileal loops."

Inquiry into her social surroundings showed them to be most unfavourable, and she was discharged from the hospital in the belief that her abdominal symptoms were not due to organic disease. She continued to get worse, however, and a few weeks later said that at times she could take only liquid diet.

Two intubations were carried out and showed a persistent deformity in the terminal ileum (fig. VII), although there was little regurgitation. On a third intubation, done just before operation for postoperative decompression in case resection of bowel should be required, the balloon stopped at the same place.

At operation an adhesion between the mesentery and the anterior abdominal wall was found, and the terminal ileum was studded with small tubercles. It was not possible to demonstrate a persistent angulation of the intestine, and it was not clear whether the deformity seen after intubation was caused by some mechanical effect of the adhesion or by spasm of the gut due to the tubercles.

CASE 5.—A female, aged 56, had suffered from epigastric discomfort and fullness, worse after taking coarse vegetables and heavy meats, for ten years: from diarrhœa irregularly for two years; and from occasional attacks of severe pain in the right lower abdominal quadrant for two months. Physical examination was essentially negative, except for vascular hypertension. A cholecystogram and biliary drainage gave negative results.

A barium enema revealed some irregularity of the cæcum, suggesting a congenital band, and radiography after a barium meal revealed delayed small intestinal motility and some irregularity of a loop of ileum in the right lower quadrant. It was not clear that this was the terminal loop, and an intubation was recommended in order to localise the lesion.

The balloon became arrested in the left upper quadrant, in which situation no abnormality had previously been noted, and on the injection of barium a sharp angulation of the intestine was seen (fig. VIII). The remainder of the small intestine and the cæcum appeared irregular.

In view of the length of bowel that seemed to be involved, of subsequent improvement in the patient's symptoms, and of her not being a good surgical risk, it was decided to adopt conservative rather than operative treatment.

CASE 6.—A female, aged 37, had had acute appendicitis with rupture and operation with drainage at 10. After this she had had increasingly frequent attacks of colicky lower-abdominal pain associated with rumblings, nausea, and vomiting, made worse by a high-residue diet. No significant physical signs were demonstrated.

She was intubated, and barium was injected when the balloon became arrested. The observations suggested adhesions of the middle part of the ileum, so extensive as to render surgery difficult (fig. IX), and in view of this and her good response to a low-residue diet conservative treatment was adopted.

CASE 7.—A female, aged 38, had suffered from aching right-sided abdominal pains for years, because of which her appendix had been removed eleven years before and a retroverted uterus suspended five years previously. In the last two to three years she had had complaints of a different character: mid-abdominal, colicky, accompanied by nausea and vomiting, and aggravated by foods with a high cellulose content.

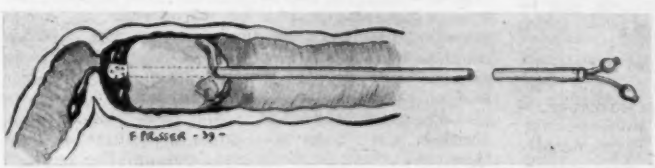

FIG. I—Miller-Abbott tube in bowel, with the balloon inflated to prevent regurgitation. Barium emerges from the tip of the tube. As used in case 1 and in first intubation of case 4.

During that time she had also noticed frequent abdominal rumblings, audible also to others.

Examination gave negative results, except for some immobility of the uterus. A barium meal showed the terminal ileum to be more active than normal and rather tender. On intubation the balloon was arrested in the right lower quadrant. Injection of barium suggested narrowing at the point of arrest and showed some regurgitation (fig. X). A second intubation again demonstrated the narrowing. Operation was postponed.

CASE 8.—A female, aged 24, had complained of irregular attacks of knife-like pain in the right lower abdominal quadrant, lasting 5–10 min. over a period of two years, with recent dull aching in the same area. Appendicectomy ("clean case") had been performed thirteen years previously.

A barium meal showed gas-filled intestinal loops,

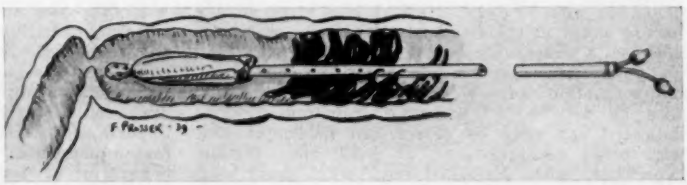

FIG. II—Modification of Miller-Abbott tube, with perforations, fore and aft of the balloon, communicating with the larger lumen of the tube. Balloon shown deflated before the injection of barium, to indicate degree of regurgitation and to allow barium to reach the point of arrest.

delayed motility, and some tendency of the small intestine to remain in the pelvis when the patient was inverted. It was thought that there were adhesions or some other intestinal abnormality, causing partial obstruction. A balloon inflated with 30 c.cm. of air, however, readily entered the cæcum and passed into the sigmoid colon within twenty-four hours; this was believed to rule out any significant organic lesion of the small intestine. Other studies also gave negative results, and subsequent investigation suggested that her symptoms were probably on a purely functional basis.

CASE 9.—A Jewess, aged 30, had a resection of her terminal ileum, cæcum, and ascending colon for regional ileitis in May, 1935, and subsequently progressed well except for diarrhœa and a duodenal ulcer shortly after operation. When seen in May, 1939, she still complained of ulcer pain and of passing several watery motions daily; also of pain in the right lower abdomen. Examination showed her to be in good general condition with some diffuse abdominal tenderness and thickening in the region of the anastomosis between the ileum and transverse colon.

A barium meal showed an ulcer of the posterior duodenal wall and some intestinal hypermotility. Two loops of the small intestine in the right abdomen were tender and distinctly abnormal in pattern but seemed to maintain proper relative positions. A barium enema flowed freely through the anastomosis and formed a puddle in the terminal ileum. There was evidence of recurrence of ileitis.

On intubation the balloon passed freely into the sigmoid colon. This was taken to establish the patency of the bowel lumen, and no operation seemed indicated.

DISCUSSION

Radiography of the small intestine after an ordinary barium meal has never been very satisfactory, because of its great length and the impossibility of concentrating the barium mixture at any suspected site without obscuration by overlying barium-filled loops of bowel. Although delayed motility, gas-filled loops, or irregularity of the pattern may suggest the presence of a lesion, it is unusual to secure convincing evidence. The work of Weltz (1939) shows that after duodenal intubation barium may be injected at such a rate as to give a beautiful picture of the intestinal pattern, but one is still faced with the difficulty of examining the whole length of bowel and with the impossibility of obtaining a concentration at any part without interference from adjacent barium-filled loops.

In the method here described, after arrest of the balloon has attracted attention to the probable site of a lesion, a small injection of barium will demonstrate the local intestinal pattern and whether or not there is any regurgitation. A larger quantity can then be injected to demonstrate the shape, distensibility, and irritability of the bowel. Although a balloon distended with 30 c.cm. of air may be arrested at a narrow point in the small bowel, this by no means indicates a measurable degree of organic obstruction, and yet it does suggest a qualitative alteration in the motor function of the bowel that often cannot otherwise be detected. Whether or not operation is indicated can only be determined in conjunction with other considerations, at least until further experience with intestinal intubation has been obtained.

On reviewing the histories of the cases demonstrated to have partial obstruction, it was observed that they had most pain after taking food with a high residue, and it is felt that detailed inquiries with regard to this point and trial periods on alternate high-residue and low-residue diets may provide valuable additional information.

Attention is called to four types of cases herein reported: (1) those in which the findings on intubation were confirmed at operation (cases 1 and 2); (2) those in which the observation of obstruction was not confirmed, but some other pathological condition in the immediate vicinity of the suspected lesion was found (cases 3 and 4); (3) those in which, in spite of suggestive findings on intubation, operation, because of other clinical conditions, was not undertaken (cases 5, 6, and 7); and (4) those in which obstruction, suggested by the clinical evidence, was disproved by intubation (cases 8 and 9). All of these groups deserve further study.

Some of the apparent narrowings of the intestine, as demonstrated by intubation, may be due to fixed local spasm of the bowel, such as Golden (1936) has described in connexion with healed tuberculous glands midway between the root of the mesentery and its bowel attachment. I have as yet encountered no such cases, but they must be kept in mind.

A trial of the various types of apparatus described has shown the standard Miller-Abbott two-lumened intubation tube to be preferable in most cases, because with it (1) the patient can be fed soon after the tube has entered the intestine (residue being aspirated from the proximal holes), and (2) abdominal pain due to distension behind the balloon can be avoided by constant suction through the perforations behind the balloon.

When barium is injected directly into a partially obstructed bowel and immediately behind the point of stenosis, it is usual for considerably more regurgitation to take place than in normal subjects, but, except in extreme cases such as case 1, it can usually be caused to pass through the lesion by manipulation.

SUMMARY

Intubation of the small intestine by the Miller-Abbott tube provides a method of demonstrating and localising many partially obstructive lesions not otherwise recognisable. It also serves to eliminate obstructive bowel lesions in suspected cases.

Observations suggesting obstruction are permanent arrest in the passage of the balloon, unusual regurgitation of an injected barium mixture, and persistent narrowing of the gut distal to the shadow of the balloon.

Experience is necessary in the interpretation of the observations, if one is to distinguish between the organic and the functional obstructions, for localised spasm of the bowel incident to adjacent lesions, such as peritoneal tuberculosis and healed tuberculous glands, may also arrest the advance of bowel contents. Permanent arrest, however, usually indicates some localised pathological process in the bowel or its vicinity.

In the cases where the constriction seen after the injection of barium was found at operation to be due to disease of the bowel wall with narrowing there was considerable regurgitation, and in the absence of regurgitation only an adjacent lesion was found. It is felt that disturbance of function is at least equal in importance to anatomical abnormality, and for this reason particular attention should be paid to the behaviour of barium injected with the balloon deflated and no artificial barrier present.

Although the technique of intestinal intubation is more time-consuming than ordinary radiography and requires some special training and experience on the part of the physician, it is well tolerated by patients, and its advantages seem to entitle it to become a routine diagnostic procedure.

I wish to thank Drs. E. L. Eliason and I. S. Ravdin for allowing me access to certain cases from the surgical clinic of the University of Philadelphia Hospital; Dr. E. P. Pendergrass and his associates for their willing coöperation in radiography; and Dr. T. Grier Miller and his associates for their encouragement and help in collecting clinical material necessary for this investigation.

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VITAMIN E

IN THE TREATMENT OF MUSCULAR DYSTROPHIES AND NERVOUS DISEASES

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IT has been suggested by Einarson and Ringsted (1938), working on rats in Denmark, that the muscular dystrophies, amyotrophic lateral sclerosis, and tabes dorsalis are due to a deficiency of vitamin E. If this suggestion proves to be correct—my clinical results, so far, certainly support it—the muscular dystrophies and amyotrophic lateral sclerosis, which have been hitherto regarded as incurable, are now curable. Further, the reason why some syphilitics develop tabes and others do not is explained, and the arrest of tabes is made possible.

EXPERIMENTS ON ANIMALS

Ringsted (1935) first reported neurological disturbances in adult rats fed for a long time on a diet free from vitamin E. He continued extensive laboratory experiments and histological investigations with Einarson for three years and then published their findings (Einarson and Ringsted 1938), which leave no possible doubt as to the great importance of vitamin E to the nervous and muscular systems.

The rats first develop symptoms about fifteen weeks after the beginning of the diet free from vitamin E; these are always a mild ataxic disturbance of gait

affecting only the hind legs. As the condition progresses the ataxia becomes extreme, and there also develops flaccid paralysis with gross wasting of the muscles of the hind quarters and back legs. At last the rat can only move by dragging itself about by its forelegs, which are seldom involved. In spite of this paralysis the general condition, mentality, and appetite are good, and the rats have been kept alive for as long as two years.

PATHOLOGY

Two morbid processes—nervous and muscular—underlie the condition; although they develop simultaneously, they may for simplicity be considered separately. The initial nervous lesion is a degeneration, in the lumbar region, of the proximal parts of the posterior roots and the proprioceptive paths in the posterior tracts and probably in the uncrossed tactile paths. The amount of neuroglial reaction is inconstant, depending apparently on the rapidity of the degeneration. The cells of the spinal ganglia are not affected. Degeneration of the anterior-horn cells of the lumbar cord generally begins shortly after the degeneration of the posterior columns and progresses until it is more or less complete. With the death of the motor cells the motor fibres of the peripheral nerves degenerate and the muscles atrophy. The pyramidal tracts might be expected also to be constantly affected instead of only slightly and rarely, but these tracts are of very recent origin in the evolution of the nervous system, being unimportant in the rat and not really analogous to those in man. As it is, "We have, on the whole, a pathologic-anatomical picture that resembles closely a combination of two of the most important systemic degenerations occurring in man, namely: tabes dorsalis and spinal progressive muscular atrophy" (Einarson and Ringsted 1938). If the rat had true pyramidal tracts, the picture would be complete.

Primary muscular degeneration is the other important finding. The histological picture was not observed in its typical form in the rats, though muscles examined during the earliest stages of the diet undoubtedly suggested a primary muscular degeneration. It was difficult to reach any definite conclusion, for the secondary muscular degeneration due to the involvement of the anterior-horn cells developed so widely and so soon that it masked any primary changes in the muscles themselves.

Later work (Morgulis and Spencer 1936, Morgulis, Wilder, and Eppstein 1938, Olcott 1938, Madsen 1936) on several different kinds of young animals proves beyond doubt that true primary muscular dystrophy occurs. Probably the reason why these workers have been able to investigate the muscular dystrophy unhampered by the effects of a secondary nervous degeneration are because they have all used young animals, in which, as indeed in children, muscular dystrophy is produced rather than nervous degeneration. In other words, in the adult it is the nervous system, in the young the muscular, which is most sensitive to a deficiency of vitamin E. Einarson and Ringsted (1938) emphasise the fact that the degenerations in their adult rats can only be stopped if vitamin E is added to the diet before the neurological symptoms are far advanced. Great regeneration of the dystrophic muscles in young rats was also found by Morgulis, Wilder, and Eppstein (1938), who carefully checked their results by biopsies.

VITAMIN E IN NORMAL DIET

It appeared to me, however, that before beginning to use vitamin E for human diseases it was necessary to decide if it could be insufficient in normal diets. This I believe to be so. The common English foods in which vitamin E is present, though in small amounts, are milk from pasture-fed cows, egg yolks, animal fats and flesh, though not viscera, vegetable oils, and some fruits. Green leaves and, especially, wheat-germ oil have a very high content. Though vitamin E is very stable to heat, light, and desiccation, it is easily decomposed in the presence of certain salts and fats, especially when the latter become rancid. Thus it seems highly probable that considerable deterioration may take place in imported meat which has been preserved for many weeks and in milk which has been pasteurised and become staler than is generally realised (Hewlett and Nankivell 1921). Further, most hens live under grossly artificial conditions with a lack of natural food, so that the yolks of their eggs may certainly be deficient in vitamins (Barnum 1935). Early rancidity of stale butter and margarine may also destroy the vitamin. In fact the foods which should contain a small amount of vitamin E may well contain none by the time they are eaten. Turning to the foods which are rich in the vitamin, the most important, wheat germ, is to all intents and purposes never eaten. It is left in stone-ground flour, but few people use this; and it is returned again, after being specially treated, to some brown breads, but the special treatment it receives may well destroy its vitamin. Green leaves, the other rich source of vitamin E, are eaten though never in large quantities by dried weight. Indirect evidence of a deficiency in our diet is also given by the good results reported by Currie (1936), Vogt-Møller (1933, 1936), and Shute (1937) from giving vitamin E for recurrent miscarriages.

It is not therefore wholly unreasonable to consider that our diet may in some cases be on the edge of a vitamin-E deficiency: a deficiency which might become serious if for any reason absorption from the gut was impaired, or if the demands of the muscular and nervous systems were higher than normal, either from an hereditary disposition or from toxic influences, such as syphilis in tabes. The systems to suffer from such a deficiency would depend on the age of the patient and on whether any nervous tracts had already been weakened by other causes.

Many obscure lesions of the muscular and nervous systems might be explained in this way. Tabes would be regarded as the result not of syphilis alone, but also of a deficiency of vitamin E, causing degeneration of nerve tracts already weakened by syphilis. The muscular dystrophies and amyotrophic lateral sclerosis, which have hitherto been dismissed as unconnected abiotrophies of the muscular and nervous systems, would be interpreted as the same deficiency disease having one form in children and another in adults.

It is important to realise that the anti-sterility factor—i.e., α-tocopherol—is probably not identical with the myotrophic and neurotrophic factors (Goettsch and Ritzmann 1939), though they all occur together in wheat-germ oil. I therefore treated the following cases with fresh dried whole-wheat germ ½ oz. twice daily, one for as long as eighteen months. The results support my belief that the muscular dystrophies and, most probably, amyotrophic lateral sclerosis are deficiency diseases and are curable.

MUSCULAR DYSTROPHY

CASE 1.—Male, aged 4. When first seen legs and thighs very weak. Calves hard and prominent. Fell every other step, typical "climbing up himself." After eighteen months' treatment and exercises calves

feel and appear normal, dorsiflexors of feet and flexors and extensors of knees very weak but still improving; falls about every thirty steps, gets up without rolling over or "climbing up himself," though with difficulty.

CASE 2.—Male, aged 8. When first seen could not dress, sit up, or brush hair. Lips very loose. Could stagger a few paces. Bad contractures of hips, knees, and ankles. Thigh muscles chiefly affected. Calves very hard and prominent. Arms weak. Winged scapulæ. The contractions were largely relieved by surgery and massage. After ten months' treatment the arms appear normal, with no winging of scapulæ. Arm ½ in., forearm 1 in. larger in circumference. Can brush hair and dress. Lips firmer. Calves feel much softer and are less prominent, though really 1½ in. larger in circumference. Definite improvement in muscular power of legs. Can walk about 100 yards.

CASE 3.—Male, aged 6. Early case. Slight weakness of arms. Dorsiflexors of feet most affected. Contractures of ankles. After two months leg muscles slightly improved with vitamin E and massage. Then operated on. After four months arms normal, having had no massage.

CASE 4.—Male, aged 11. Very advanced case. Bed-ridden. Gross wasting of arms and legs. Could not raise arms above head. Legs treated surgically and with massage for contractures. After four months' treatment leg muscles appear stronger, and he can raise arms above head.

CASE 5.—Male, aged 11. Very advanced case. Bed-ridden. Contractures of legs. Wasted and weak. Arms extremely weak and wasted, difficulty in moving them from under bed-clothes. After five months' treatment arms much stronger, especially triceps. Can wheel himself in chair. Legs treated surgically.

CASE 6.—Male, aged 7. Early case. Elder brother affected. Getting worse in spite of massage for last year. Stumbled often when running. Went upstairs slowly. Calves typical. After three months' treatment and massage he goes up stairs better, runs better, and his calves are much softer.

CASE 7.—Male, aged 7. Early case. Younger brother affected. Getting worse in spite of massage for last year. Fell often. Dragged left foot. Went upstairs with difficulty. Arms slightly weak. Calves typical. After four months' treatment and massage arms appear normal, left leg drags less, he falls less, and gets up quicker, walks further, goes upstairs more easily, and his calves are much softer.

CASE 8.—Male, aged 11. Very advanced case. Could not stand. Could not bend, stretch out legs in bed, sit up, or dress. Difficulty in getting arms from under bed-clothes. After eight months' treatment he can put on his shirt, trousers, and shoes with great difficulty. Can bend knees to about 90° and stretch them out. Can sit up alone, using his arms to help. Wheels himself in chair with comfort.

CASE 9.—Male, aged 14. Advanced case. Could not walk, chiefly due to contractures of legs. Arms very weak. Could just use wheeled chair. Could not get into bath. Full sexual development. After five months' treatment he wheels himself about in his chair freely. All muscles in arms much stronger. Can get into bath.

CASE 10.—Male, aged 9. Early case. Younger brother affected. Getting worse in spite of massage for last year. Stumbled often when running. Stairs difficult. Calves typical. After three months' treatment and massage calves much softer. He appears better to me, though his mother is dubious.

CASE 11.—Male, aged 22. Advanced case. Great weakness of arms and shoulder girdle. Contractures of thighs. Leg muscles not greatly affected. Normal sexual development. After nine weeks' treatment legs stronger, arms very much stronger. For the next four months treatment was stopped, and both arms and legs were much weaker.

CASE 12.—Male, aged 8. Early case. Slight improvement in walking reported in a month.

CASE 13.—Male, aged 30. Advanced case. Condition first noticed nineteen years ago. Hardly any change in last three years. Can just stand and just shave. Sexual development normal. No effect from six weeks' treatment.

CASE 14.—Male, aged 14. Advanced case. Mentally deficient. Full sexual development. No change with four months' treatment.

CASE 15.—Male, aged 10. Advanced case. Bed-ridden. Treatment and massage had no effect in a month.

CASE 16.—Male, aged 18. Very advanced case. Gross wasting of all muscles. Could not move or feed himself. Sexual development normal. Six weeks' treatment had no effect.

CASE 17.—Male, aged 17. Advanced case. Bed-ridden. Could just feed himself. Sexual development normal. Six weeks' treatment had no effect.

CASE 18.—Male, aged 10. Very last stages. Died after a month's treatment.

AMYOTROPHIC LATERAL SCLEROSIS

CASE 19.—Male, aged 49. Six years ago whole of right hand suddenly became numbed and paralysed, with great wasting. Arm not affected. Apparently diagnosed as brachial neuritis. Right hand has slowly improved since. Six months ago left hand started to feel weak and to waste, and legs felt tired, the condition slowly getting worse. Amyotrophic lateral sclerosis was diagnosed by a consulting physician and his own doctor. On examination he appeared to be a typical case. There was gross wasting of all muscles of the right hand. The left hand had some wasting of the thenar muscles and the interossei but no fibrillation. There was extensive fibrillation of all the muscles of both legs and feet. All reflexes were normal. There were no sensory changes. Two months after beginning treatment there was no longer any feeling of tiredness in his legs, and his hands if anything were stronger. The left thenar muscles appeared less wasted. Fibrillation was worse in the legs. A month later there was definitely more muscle both in the left hand and the right, and the fibrillation in the legs had decreased. After seven months' treatment, "he has forgotten his left hand was ever weak." His legs feel normal. On examination his left hand appears normal, his right much stronger and with an increase in muscle. There was no fibrillation in his right leg or foot, and very little in his left.

CASE 20.—Female, aged 65. Six months' history of progressive weakness and stiffness of legs and weak hands. On examination could just walk across room. Legs spastic, extensor response, mild fibrillation. Cerebrospinal fluid normal. Hands slightly wasted, with some fibrillation. Worse after a month's rather uncertain treatment; but after another two months' treatment is reported to be improving.

CASE 21.—Female, aged 45. Treatment was started in the last stages of bulbar paralysis, and the patient died six weeks later.

CASE 22.—Female, aged 38. Treatment was started in the last stages of bulbar paralysis, and the patient died four weeks later.

TABES DORSALIS

CASES 23 and 24.—Two cases of tabes dorsalis, one blind and both bed-ridden, were treated for eight weeks for very severe lightning pains and abdominal crises. Neither improved.

PERONEAL MUSCULAR ATROPHY

CASE 25.—Male, aged 18. His maternal uncle died of peroneal muscular atrophy. The patient developed symptoms when he was 12, which have progressed very slowly, neither hands nor feet being very

affected. His sexual development is normal. Two months' treatment has had no effect. The progress of the disease is too slow to know if it has been checked or can be improved.

AMYOTONIA CONGENITA

CASE 26.—Female, aged 2¼. There had been extreme muscular weakness since birth. The child could just raise her arms and draw up her legs but could not roll over or raise her head. There was gross kyphosis. After three months' treatment and massage she could kick her legs in the air and her arms were much stronger. She could raise her head and could roll over. Vitamin E was then stopped, and her improvement appeared to be slower.

DISCUSSION

In the group of the myopathies—chiefly children—the results of treatment with vitamin E were remarkable. Every patient improved who was treated for more than six weeks, except case 14, who was mentally deficient. When it is remembered that these cases should have got worse or at least remained the same, such definite improvement in 12 cases out of 13 must mean that this treatment promises success in a disease which has always, until now, been hopeless. The slowness, however, of the recovery and therefore the necessity for prolonged treatment must be emphasised. Recovery has continued in case 1 for eighteen months and in no case has shown any signs of stopping. How far it can go is as yet unknown, but there seems to be no reason why patients in an early stage should not recover completely, provided that they continue to be treated. The diagnosis, however, should be definite before treatment is begun; otherwise an apparently normal child may continue to be treated to guard against a relapse of a disease he may never have had. This danger of a relapse is shown in case 11.

Even bed-ridden patients show improvement. Since these children often have a long period of growth still before them, it seems possible that they may recover enough to lead comparatively normal lives. Since much of the disability in advanced cases may be due to contractures, these should be dealt with surgically at the beginning of treatment, so that the recovering muscles can function normally.

No ill effects or sexual stimulation have been seen during treatment.

Not enough patients with amyotrophic lateral sclerosis have been treated for the results to be definite, but on the whole I think they are promising. Case 19, in whom the disease is arrested and who feels normal again, has no obvious involvement of upper neurones. Case 20 has been treated for three months, and is reported to be improving. The two patients who died had advanced bulbar involvement before treatment began.

The two cases of tabes (23 and 24) were too advanced for the negative results to be of any value, but I still believe vitamin E will be found of value in this condition. The man with peroneal muscular atrophy (case 25) has not been treated long enough for any conclusions to be drawn. The small girl with amyotonia congenita (case 26) appeared to have been greatly improved.

It appears reasonable to suggest that in all degenerations of the muscular or nervous systems, such as disseminated sclerosis, a large supply of vitamin E should be of value; for, though a deficiency may not be the cause, yet a sick cell should have an abundance of what is necessary for its life. It also may be that in children who have a diet rich in vitamin E the anterior-horn cells would be more resistant to infantile paralysis; hence, at least during epidemics, the vitamin should be used as a protection.

The clinical results reported here strongly confirm the deductions which Einarson and Ringsted (1938) made from their laboratory work. The discovery of the importance of vitamin E in the treatment of muscular and nervous diseases appears to be revolutionary. It opens up new lines of thought and treatment in many diseases. It appears indeed to be one of the great advances in general medicine of the century.

SUMMARY

The laboratory work of Einarson and Ringsted (1938) is discussed, and the reasons are given for their suggestion that the muscular dystrophies, amyotrophic lateral sclerosis, and tabes dorsalis are deficiency diseases due to lack of vitamin E.

Normal human diets may be poor in vitamin E.

The results of giving vitamin E for muscular dystrophy and amyotrophic lateral sclerosis support the contention that these are deficiency diseases and curable.

I am deeply indebted to Beroë Bicknell, who has been responsible for my doing this work. My warmest thanks are due to Professor Einarson and Dr. Ringsted for their help and collaboration. I must also express my gratitude to the London County Council Health Service for giving me all its unique facilities and advantages without which this work could not have been done.

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The Lancet 100 Years Ago

Jan. 4, 1840, *p.* 533.

From a lecture by Dr. CHARLES WALLER *delivered at Bartholomew's Hospital.*

Would the transfusion of healthy hot blood be of service in the more extreme forms of menorrhagia? I am well aware of the objection which has been raised against this operation, and which has been often reiterated in nearly these words, or at any rate to this effect:—"What is the use of transfusion, whilst the drain is still going on? As fast as you put blood into the arm it would escape by the orifices of the uterine vessels." Let us examine this objection a little. We readily allow that the extremities of these vessels are sufficiently open to allow the passage of pure blood through them, yet this state is the result of debility, and this debility, be it remembered, occasioned by the loss of the vital fluid. Now, it is by no means inconsistent with sound principle to expect, under these circumstances, that, with an increase of pure, healthy blood, this condition of general exhaustion will be relieved, and such a degree of tonicity given to the muscular fibres of the uterus, as well as to its capillary vessels, as to produce a certain degree of contraction, which would be sufficient to avert the impending danger. So far as regards myself, I should feel that I had not performed my duty if I had suffered a patient who had died of hæmorrhage without having proposed the operation.

ANÆMIA OF PREGNANCY IN INDIA

ITS TREATMENT WITH CHOLESTEROL

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IN India one of the commonest anæmia syndromes is that associated with pregnancy. In two of the biggest maternity hospitals of Calcutta, at certain times of year, the incidence goes up to 5 per cent. or more of the total admissions (Chatterjee 1938). The disease affects all religions and races—Christians, Jews, Moslems, Buddhists and Hindus (McSwiney 1927, Gupta 1932, Mudaliar and Rao 1934, Chatterjee 1937).

The recognised causes of secondary anæmias in the tropics have been excluded as contributory to this particular type (McSwiney 1927, Wills and Mehta 1930, Mitra 1931, Gupta 1932, Chatterjee 1938). In the earlier months of pregnancy the condition starts as a mild normocytic anæmia and within a short time it passes through the microcytic to the severe macrocytic stage (Chatterjee and Basu 1938). Anæmia with such rapidly changing phases is not seen in men or in non-pregnant women, and pregnancy is therefore to be considered its central causative factor. There is a strong tendency to spontaneous recovery after confinement, with or without treatment.

Several associated and interesting features of the disease may be mentioned. One of them is the seasonal variation (Balfour 1927, Wills 1931, Mitra 1931, Chatterjee 1938). In Calcutta the cases begin to appear in June and July, after the onset of the rains, and reach their highest point in September; the number then remains fairly constant up to December, when it again falls, reaching a very low level in February, March and April. The maximum age-incidence is between 20 and 29 years, and the anæmia is more prevalent in the earlier pregnancies, the majority of cases being in primiparæ (Chatterjee 1938, Chowdhury and Mangalik 1938).

Most of the cases suffer from chronic intermittent fever due to secondary bacterial infections (Chatterjee 1938). In the early stages there is œdema of the ankles and in the later months a general anasarca; the swollen face looks somewhat Mongolian, owing to the obliteration of the facial lines and contours, and in one of the biggest maternity hospitals in Calcutta, where special "anæmia wards" have to be opened after the onset of the rains, one may see rows of patients looking like sisters. The output of urine is diminished, but only while pregnancy lasts (Chatterjee 1938a).

Wills (1933) observed that the van den Bergh reaction is negative, urobilinogen is absent from the urine and free hydrochloric acid is present in the stomach (Wills 1930, 1931). Chatterjee and Ghosh (1938, 1939) obtained normal acidity curves in the majority of the cases examined, and also normal values for the bilirubin index, icterus index and fragility tests. The patients do not appear to belong to any particular blood group and no incompatibility has been observed between the blood of the infant and that of the mother (Chatterjee 1938). I could find no constant bacterial flora in the stools, either by aerobic or anaerobic technique, nor any other evidence that the anæmia is caused by hæmolytic bacteria (Chatterjee 1938). Moreover, the normal bilirubin index and icterus index, and the absence of urobilinogen in the urine, are against a hæmolytic origin.

THE BLOOD-PICTURE

Opinions differ about the colour-index.

Balfour (1927) obtained an average colour-index of 1·4, Mitra (1931) 1·3, and Gupta (1932) 1·1. Mudaliar and Rao (1932–33) noted a high index in the majority of their cases, but they took 0·95 as the normal for comparison. Wills (1933–34), in criticising Mudaliar and Rao for their failure to obtain positive results with vitamin therapy as suggested by her, was disinclined to accept the cases with low colour-index as cases of pregnancy anæmia.

There seems to be similar divergence about the diameter and the size of the red corpuscles.

Kersley and Mitchell (1934) recorded cases of microcytic anæmia and emphasised the importance of iron therapy. Witts (1932) described pregnancy-anæmia cases as essentially macrocytic; Larabee (1925) and Wintrobe (1930) found the mean corpuscular volume increased. Parvu and Fouquiau (1932) and Hampson and Shackle (1924) worked out Price-Jones curves showing a considerable shift to the right, which indicates a macrocytic type of anæmia.

The cases have been usually classified into macrocytic, normocytic and microcytic types, as well as hyperchromic, hypochromic and normochromic types (Whitby 1934, Wintrobe 1934, Vaughan 1936, Adair, Dickmann and Grant 1936, Mudaliar and Rao 1933, Mitra 1937). This classification when based on single observations is likely to create great confusion about therapy; and it will be asked why the same visible ætiological factor (pregnancy) produces widely differing blood-pictures. A partial answer is offered by Chatterjee and Basu (1938), who have shown that one and the same case may pass (in either direction) through the various phases, depending on the degree of anæmia. In the first stage the blood-picture is normocytic. With deterioration, the anæmia increases and becomes microcytic. A third stage represents the borderland between hæmopoietic failure and compensation; the blood-picture is microcytic or normocytic but hyperchromic. In the fourth stage (bone-marrow failure) the picture is macrocytic and hyperchromic. We found that iron therapy is of great value in the first and second stages and can prevent a downward drift; and in the third stage liver therapy is of similar assistance. But neither of these substances is of any use in the fourth stage, when blood transfusion is alone likely to be of some help.

TABLE I—BLOOD CHOLESTEROL IN MG. PER 100 C.CM. OF WHOLE BLOOD *

—	Normal pregnancy	Pregnancy anæmia	Other secondary anæmias†	Normal males (Mukherjee 1928)
Maximum ..	250	155	200	160
Minimum ..	140	50	50	124
Average ..	180	85	135	140
Standard deviation ..	± 36·3	± 23·8	± 46	F‡
Subjects examined ..	55	53	32	26

* The method followed is that of Bloor (1915).
† The causes of the secondary anæmia were as follows: Kala-azar, 10; chronic hæmorrhage, 3; helminthiasis, 7; malignant growth, 2; chronic gastro-enteritis, 3; malaria, 2; other diseases, 5.
‡ Figure not available.

BIOCHEMICAL FINDINGS

Although hæmatological investigations give very necessary information about the type and the degree of anæmia, they throw little light on the central underlying event—namely, pregnancy. Here we are more likely to benefit from biochemical investigation.

Serum proteins.—Chatterjee and Ghosh (1938) estimated the albumin and globulin contents of the serum in normal pregnancy and in anæmia of pregnancy. Serum globulin was increased in some of the normal pregnancies; but in anæmia of pregnancy it was greatly increased, while the serum albumin was diminished; indeed in some cases the normal albumin-globulin ratio was actually reversed. Our later work (1937) has demonstrated that the increase in the globulin is due to the euglobulin alone, the pseudo-globulin remaining more or less constant.

It would be unwise to regard the change in the serum proteins as an isolated phenomenon. The close association between the serum proteins and the sterols has been observed by Gardner and Gainsborough (1927), Muller and Heath (1933), and Fishberg and Fishberg (1928). With the loss of plasma proteins in certain types of anæmias there are also changes in the blood-cholesterol, presumably for the purpose of maintaining the colloidal osmotic pressure. This association between the euglobulin fraction and the sterols is particularly close (Handovsky and Lobmann 1925, Gardner and Gainsborough 1927).

TABLE II—PROGRESS OF TWO CASES, WITH VERY LOW AND MODERATELY LOW BLOOD-CHOLESTEROL (CHATTERJEE AND GHOSH 1938)

Case 1 Initial blood cholesterol 50 mg. per 100 c.cm. Liver and iron therapy			Case 2 Initial blood cholesterol 100 mg. per 100 c.cm. Liver and iron therapy		
Date	Red cells (millions)	Reticulocytes (%)	Date	Red cells (millions)	Reticulocytes (%)
Oct. 5 ..	0·77	30	Jan. 5	0·79	1·2
„ 13 ..	0·57	24	„ 19	0·89	44·5
„ 29 ..	0·68	57	Feb. 8	1·80	2·3

Blood-cholesterol.—Chatterjee and Ghosh (1938) examined the total cholesterol in normal pregnancy, in the anæmia of pregnancy, and in other types of secondary anæmias. Like many other observers, we found an increase of cholesterol in pregnancy, possibly due to the increased demand of the maternal tissues for cholesterol.

Kaufmann and Mühlbock (1933) observed that in spite of the hypercholesterolæmia there is a negative cholesterol balance in the mother owing to an excessive excretion of cholesterol in the fæces. The fœtus also removes a large amount of lipoids and fats of the mother (Guillemet 1920). Sinclair (1933) showed that the placenta of the rat, like that of the dog and the rabbit, is permeable to fatty acids, and Chaikoff and Robinson (1933) likewise demonstrated a transfer of fat across the placenta.

In anæmia of pregnancy, on the other hand, we found a remarkable fall in the blood-cholesterol—a fall much more pronounced than that seen in other varieties of secondary anæmias (table I).

We also observed a definite relation between the blood-cholesterol and the clinical state of the patient. Cases with very low cholesterol figures show a very unsatisfactory response to treatment with iron and liver-extract; whereas those with better figures (above 100 mg. per 100 c.cm.) showed more rapid clinical improvement (table II).

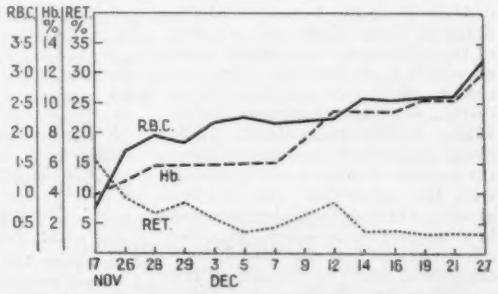

FIG. 1 (case 12)—Aged 24 and in her third pregnancy. On admission: anasarca and scanty urine. Mean corpuscular volume, 105 cμ; colour-index, 1·6. Intramuscular injections of cholesterol every alternate day. Patient left hospital before her confinement; on discharge she was in good condition.

In a separate series we examined the total cholesterol, the free cholesterol and ester cholesterol from blood in anæmia of pregnancy and in normal pregnancy, and observed a marked diminution in the ester-cholesterol fraction in the anæmia cases, the free cholesterol showing a slightly low or normal figures (table III).

I have reported that a fair number of cases of pregnancy anæmia suffer from secondary bacterial infections as evidenced by a fairly prolonged rise of temperature, leucocytosis, and pathological shift in the Schilling differential count (Chatterjee 1938); and diminution of cholesterol during various infections is well known (Achard et al 1928, Okey and Boyden 1927, Mcquarrie and Stoesser 1932, Marino 1933). But low cholesterol figures were also obtained from cases having no visible sepsis, and where sepsis is present it may merely aggravate an underlying deficiency.

TABLE III—CHOLESTEROL CONTENT IN MG. PER 100 C.CM. OF BLOOD * IN NORMAL PREGNANCY AND IN ANÆMIA OF PREGNANCY (CHATTERJEE AND GHOSH 1939)

	NORMAL PREGNANCY (20 cases)			ANÆMIA OF PREGNANCY (27 cases)		
	Total cholesterol	Free cholesterol	Ester cholesterol	Total cholesterol	Free cholesterol	Ester cholesterol
Highest ..	210	128	120	144	100	67
Lowest ..	130	45	70	59	43	5
Average ..	165	77	78	100	68·6	30·8
Standard deviation	± 22·3	± 25·5	± 29·5	± 19·6	± 20·5	±22·9

* Method of Schoenheimer and Sperry (1934).

CHOLESTEROL THERAPY

From the above observations I have been led to use cholesterol in the treatment of anæmia of pregnancy, especially the more advanced cases in which the previous methods have been somewhat unsatisfactory (Chatterjee and Basu 1938).

Hitherto, despite the intensive investigation of anæmias, little attention has been paid to possible

deficiencies in the formation of the outer envelope of the red cell, one of the most important constituents of which is cholesterol. The fact that in pernicious anæmia and in certain secondary anæmias (Muller 1930, Muller and Heath 1933) blood-cholesterol decreases during the periods of relapse and increases with the remissions—the rise beginning even before the increase in reticulocytes is noted—suggests a connexion between the blood-cholesterol and the reaction of the erythropoietic tissues. In pregnancy there is a greatly increased demand for cholesterol, and a deficiency develops; the tissues affected will be those that contain much cholesterol, among which are the red corpuscles. Certainly our therapeutic results with cholesterol seem to justify further inquiry.

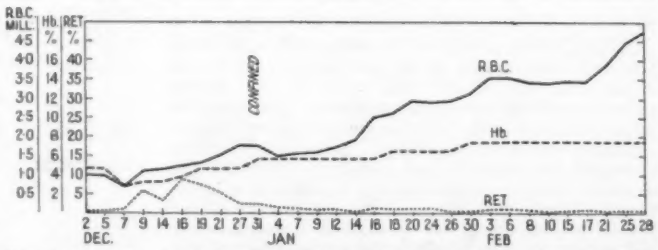

FIG. 2 (case 15)—Aged 22; admitted, about a month before the end of her second pregnancy, with anasarca, scanty urine, and respiratory troubles. Mean corpuscular volume, 110 cμ; colour-index, 1·4. Intramuscular injections of cholesterol every alternate day; also iron and ammonium citrate 15 grains thrice daily from Feb. 21, 1939.

Fourteen cases of anæmia of pregnancy have been treated by intramuscular injection of 2 c.cm. of a 5 per cent. solution of cholesterol in olive oil, given every alternate day. The initial average blood-counts of these patients was 0·85 million. The treatment was successful in all cases in raising the blood-counts to more than 3·5 million, after which a little addition of iron rapidly brought the count to more than 4 million. Two cases are illustrated in figs 1 and 2.

As controls, two other cases, with initial red-cell count of 0·95 and 1·03 million, were treated with 2 c.cm. of olive oil alternating with 2 c.cm. of Campolon

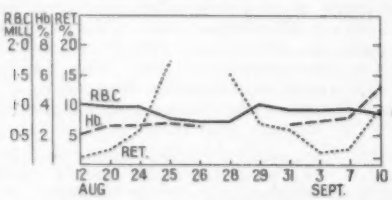

FIG. 3 (case 3)—Chart illustrating failure to respond to iron and to liver extract. Patient aged 18 years; admitted in seventh month of her first pregnancy with general anasarca and scanty urine. Mean corpuscular volume, 102 cμ; colour-index, 0·7. She was given 15 grains of iron and ammonium citrate twice daily; also campolon 2 c.cm. intramuscularly, alternating with 2 c.cm. of olive oil intramuscularly every other day. Eight ounces of blood was transfused on Aug. 26. Cholesterol therapy started on Sept. 7 but she discharged herself from hospital on the 10th, before improvement had gone far.

every other day, and also iron per mouth. These cases were followed for more than a fortnight, and on the whole the blood-picture deteriorated (fig. 3).

Two of the fourteen patients left hospital before confinement, but all the others went to term and made uneventful rapid progress. Abortion or premature labour are common events in pregnancy anæmia, and their absence in this series was presumably due either to improvement in the general condition or to some action of the cholesterol. Cholesterol therapy also appears to be of value after the termination of pregnancy (fig. 2).

It is noteworthy that in the later stages of improvement the rise in hæmoglobin does not run parallel with the rise in red cells, and iron is at this stage a useful adjuvant.

SUMMARY

Anæmia of pregnancy, as seen in India, may present various types of blood-picture—normocytic, microcytic and macrocytic as well as normochromic, hyperchromic and hypochromic. The same case may pass forward or backward through the different stages, according to whether the blood-picture improves or deteriorates. The serum globulin is abnormally high in anæmia of pregnancy, the increase being only in the euglobulin fraction.

The blood cholesterol is reduced in anæmia of pregnancy, especially the ester cholesterol fraction.

A small series of patients treated with cholesterol injection have shown improvement, and in advanced cases this remedy appears more effective than any previously tried.

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THE BASAL METABOLIC RATE: MEASUREMENT OF PRODUCTION OF CARBON DIOXIDE

By A. E. Beryl Harding, D.M.Oxfd, M.R.C.P.

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For the past five years I have been using at the South London Hospital for Women an apparatus (see figure) for estimating the basal metabolic rate (B.M.R.) which has considerable advantages over the closed-circuit methods or that involving the use of the Douglas bag. The apparatus was designed by the late Dr. E. P. Poulton, the scientific basis for the use of CO_2 production as the means of calculating the B.M.R. having been discussed by him in papers already published (Poulton 1933, 1938, Poulton and Adams 1935, 1937). The calculations may be based either on Dubois' formula—Calories per hr. = (CO_2 in litres per hr. × 6·25) − 4·92—or on the nomogram published by Poulton and Adams (1937).

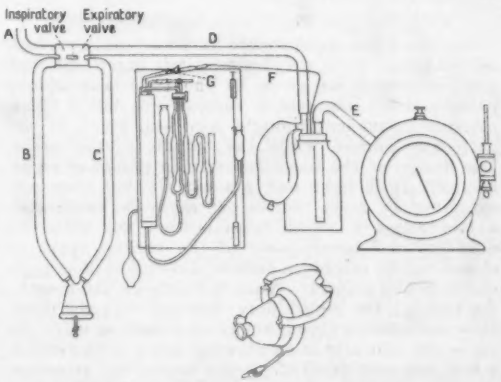
APPARATUS

Air from out of doors is led through tube A and the inspiratory valve to tube B, which is attached to the mask (see figure). The expired air passes through tube C, the expiratory valve, and tube D to a 3-litre jar, which acts as a reservoir. From the jar the air passes through tube E to a 15-litre meter of a type designed to offer the least possible resistance to expiration. In a recent test done for me by the makers the resistance was found to be equivalent to $\frac{1}{10}$ in. of water when the meter was working at 10 litres a minute. Samples from the reservoir are abstracted through F, which is made of lead tubing, with a very narrow bore, connected with the sampling tube of a Haldane's gas-analysis apparatus by a two-way tap, G. The tubes A, B, C, D, E are made of corrugated rubber with a 1-in. bore, and A and D are 3 ft. long and B, C, and E 2 ft. 6 in.

The mask is made of chromium-plated copper and has a detachable rubber face-piece with a distensible air-filled cushion. The whole is attached by a rubber band which clips round the head. It is most important to test carefully with a dental mirror round the edge where the cushion comes in contact with the patient's face, to detect any air leaks, escaping breath showing at once as a cloud of condensation on the mirror. Any leak between the metal and the rubber face-piece is equally well seen as a clouding on the polished surface of the mask. This only happens as the rubber of the face-piece is beginning to perish, when a new one must be substituted. Since using the mask with the air-cushion I have had practically no trouble with air leaks, even with edentulous, hollow-faced, or very deeply lined patients. It is occasionally necessary to stop air leaks with wisps of damp cotton-wool.

THEORETICAL CONSIDERATIONS

The scientific accuracy of B.M.R. estimations based on CO_2 production has been discussed by Poulton (1932, 1938) and Poulton and Adams (1935, 1937).



Apparatus for measuring the consumption of carbon dioxide in the estimation of the basal metabolic rate: A, inlet tube for air from out of doors; B, inlet tube to mask; C, outlet tube from mask; D, outlet tube to 3-litre jar; E, outlet tube from 3-litre jar to 15-litre meter; F, narrow-bore lead tubing connecting 3-litre jar with Haldane's gas-analysis apparatus; G, two-way tap in F.

In a private communication to me Dr. Poulton has summarised the work as follows:

"The predicted CO_2 on which metabolism depends was obtained by taking into account all Benedict's and Harris's figures for normals, and the few extra ones obtained from the literature—i.e., those of Du Bois, Hobson, Pickworth, and Murray Lyon—and correlating them with the body-weight and age. Having got the CO_2, the conversion to heat is carried out by

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means of the relation of CO_2 and heat calculated from all Du Bois' results with respiration calorimeter. There is no assumption as to RQ, as we have taken the view that a variation in RQ is a secondary effect which may be anything at the particular time that the determination is carried out, and therefore should not appear in a standard measurement."

The nomogram was constructed as follows:

"From Benedict's and Harris's numerous results and a few others the relation of CO_2 to body-weight and age was worked out for women (equation 16) and for men between 16 and 35 years (equation 14) and a special correction made for older men. Having got the CO_2, the corresponding calories were calculated by the formula: Calories per 24 hrs. = (9 × CO_2 in c.cm. per min.) − 118."

CLINICAL AND PRACTICAL CONSIDERATIONS

I consider the apparatus to have various important advantages. As is well known, it is important that great attention be given to the treatment of the patient before the test is carried out, but I think perhaps insufficient thought has been given to the patient's comfort while the test is taking place. The design of the mask has certain points of significance. It is light and fits exactly but does not compress the nose. Saliva can easily be swallowed, a fact which is worth consideration, for with the nose-clip and mouth-piece of the various types of closed-circuit machines definite discomfort is experienced in this respect. Many patients dislike breathing through the mouth only, whereas with the mask they can breathe through nose or mouth at will. So far as the difficulty in swallowing saliva is concerned, I had not considered this point before my attention was drawn to it by an American patient, who had had several tests done with a closed-circuit machine. She was most emphatic in her insistence on the discomfort of the mouth-piece and on her preference for the mask. Since then I have had several patients who have been tested by both methods and have referred to this point. Several of them have told me they prefer breathing air rather than oxygen, probably because of the smell imparted by the containers to the oxygen. It must be admitted that, having come through the rubber tubing, the air gives no impression of freshness.

A factor of importance is that the values for each 5 min. are separately read and recorded. The significance of this point is great, for the variability of readings sometimes obtained with hyperthyroid and other highly nervous patients may be considerable; if they were to breathe for 10–15 min. into a Douglas bag, the average of all their variations would be all that could be measured. This factor is not generally of importance in a physiological experiment, where tests are made on unemotional students or experienced laboratory workers. But in clinical practice the point needs emphasis, for estimation of a B.M.R. is often required in the most highly-strung patients whose variations may be considerable, as can be seen on the graphic records of the closed-circuit methods. These cases need particularly careful handling and constant watching if consistent results are to be obtained, for transient upsets may result in a sudden deepening of the respiration, giving false values for the total volume breathed, and irregular breathing may lead to great variations of CO_2 percentage. These points are brought out in table IV, which shows clearly that, had the average of the readings been the only figure obtainable, very fallacious conclusions would have been drawn.

Irregular ventilation is an important source of inaccuracy and must be watched for. Its significance has recently been shown by Carpenter (1938) to be considerable. Tests were made on a trained subject, breathing normally, and he was then instructed to breathe more deeply than usual or to hold his breath at intervals.

"Immediately thereafter observations were made during periods in which the subject voluntarily followed his own desire with regard to breathing and thus a compensation could take place. . . . The over breathing and under breathing had noticeable effects on CO_2 elimination. . . . In the first over breathing period there was a marked rise above normal of nearly 100 c.c. per min. . . . In the first shallow breathing there was a slight fall below normal. . . . Furthermore, not only was there a change in the period of voluntary abnormal ventilation, but also in all the periods immediately following the abnormal period there were changes in the CO_2 elimination. These were in the direction of compensation. . . . There was a nearly exact compensation and balance in the CO_2 elimination. . . . The balances between the O_2 absorption and the negative O_2 absorption in the recovery period were not so good."

In one test "the recovery took three 10-minute periods, as in none of these recovery periods was the CO_2 elimination at the level preceding the over ventilation period. Hence there is a marked time element in the recovery process after slight over ventilation."

From this it is clear that irregular ventilation is a fertile cause of error. When necessary tests must be

TABLE I—CONTROLS

Subject	Reading (5 min. period)	CO_2%	Air breathed per hour (litres)	CO_2 (c.cm. per min.)
Mrs. A., 36 yrs.; ht. 65½ in.; wt. 133 lb.; normal production of CO_2 (c.cm. per min.), 166	1st	2·74	375·3	171
	2nd	2·50	387·2	161
	3rd	2·43	372·8	151
	4th	2·50	387·2	161
			Aver.	= 161
			B.M.R.	− 3·0%
Sister B., 29 yrs.; ht. 63½ in.; wt. 135 lb.; normal production of CO_2 (c.cm. per min.), 172	1st	3·75	273·2	171
	2nd	3·83	264·4	169
	3rd	3·69	272·0	168
			Aver.	= 169·3
			B.M.R.	−1%
Miss C., 26 yrs.; ht. 66½ in.; wt. 105 lb.; normal production of CO_2 (c.cm. per min.), 148	1st	3·2	278·2	148
	2nd	3·2	278·2	148
	3rd	3·3	266·4	153
	4th	3·2	278·2	148
			Aver.	= 149
			B.M.R.	Normal
Miss D., 26 yrs.; ht. 66½ in.; wt. 146·9 lb.; normal production of CO_2 (c.cm. per min.), 180	1st	3·2	294·1	157·0
	2nd	3·3	290·2	158·4
	3rd	3·2	303·4	161·6
			Aver.	= 159
			B.M.R.	−11·6%
Mrs. E., 40 yrs.; ht. 67½ in.; wt. 154 lb.; normal production of CO_2 (c.cm. per min.), 180	1st	3·3	339·8	186
	2nd	3·3	339·8	186
			B.M.R.	+ 3·3%
Miss F., 24 yrs.; ht. 69 in.; wt. 148 lb.; normal production of CO_2 (c.cm. per min.), 184	1st	3·5	313·4	182·6
	2nd	3·5	311·8	181·0
	3rd	3·5	313·4	182·6
			Aver.	= 182·0
			B.M.R.	Normal
Miss G., 24 yrs.; ht. 69 in.; wt. 145 lb.; normal production of CO_2 (c.cm. per min.), 182	1st	3·7	284·9	176
	2nd	3·9	259·9	169
	3rd	3·7	289·6	179
			Aver.	= 175
			B.M.R.	− 3·8%
Nurse H., 24 yrs.; ht. 61½ in.; wt. 120 lb.; normal production of CO_2 (c.cm. per min.), 162	1st	3·3	298·3	164·4
	2nd	3·4	268·8	153·0
	3rd	3·3	298·2	163·0
	4th	3·3	298·3	164·4
			Aver.	= 161·2
			B.M.R.	Normal

repeated if, through emotional states or external factors, such as stuffiness and heat of the room, the patient has had moments of sighing respiration or shallow breathing. By careful organisation of the details of the test and by sympathetic handling of the patient this source of inaccuracy is easily eliminated.

TECHNIQUE

It may be of interest to describe the routine treatment employed at this hospital for patients who are to have a B.M.R. test. To preclude as far as possible all muscular exertion, tests are done on inpatients only. Since the last meal given in the ward is at 6.30 P.M., patients for B.M.R. are allowed Ovaltine and biscuits at 10 P.M. and a cup of tea with very little milk and no sugar at 6 A.M. on the morning of the test. I find this prevents the thirst so often complained of when no fluid was allowed after waking. At 8.45 A.M. the patient is wheeled from her bed to the couch in the test room and is left undisturbed for three-quarters of an hour before the mask is put on.

With some patients I find it is best to take the barometer and temperature reading and to do the necessary calculations before starting the test, talking to them and explaining simply what is required of them and of what the test consists. This sometimes helps them to get over their anxiety and to attain a more calm and relaxed attitude of mind. With other patients it is best to do nothing more than take the pulse-rate, explain things quickly, and put on the mask. Any delay seems to accentuate their nervousness. Unless the patient is at rest mentally as well as physically, the test is relatively useless.

After a short interval to enable the patient to become accustomed to breathing through the mask, the test is begun. The time and the exact position of the hand on the meter are noted, a sample of expired air is sucked into the sampling tube by lowering the mercury reservoir, and the CO_2 content is analysed. The number of revolutions of the meter hand must be watched and its exact position at the completion of the test period recorded. It is my custom to make four readings of 5 min. each, and during each 5 min. the pulse is taken. After some practice with the apparatus it is easy to analyse a sample, note the revolutions of the meter hand, clear the gas-analysis apparatus, and calculate the CO_2 of the sample in each 5 min. besides taking a pulse reading while each test is taking place. It is then possible to compare roughly the figures for each 5-min. period and to get an idea of the variations between the readings. It is often found necessary to discard the first figures obtained, for the patient is not accustomed to the mask and is slightly disturbed by the movements of the operator's arm involved in raising and lowering the mercury reservoir. The next three readings are generally found to be very close to each other, but occasionally they differ considerably, especially in hyperthyroid and in neurotic patients. In these cases, if the test is repeated in a few days' time, it is generally possible to get three or four satisfactory readings.

TABLE II—RESULTS OBTAINED IN SIX TESTS ON THREE HYPERTHYROID PATIENTS

Subject	Reading (5 min. period)	Pulse	CO_2%	Air breathed per hour (litres)	CO_2 (c.cm. per min.)
Miss L., 28 yrs.; ht. 62½ in.; wt. 102¾ lb.; normal production of CO_2 (c.cm. per min.), 147	1st	142	3·1	385·9	199
	2nd	136	3·1	392·3	203
	3rd	144	3·3	381·5	210
				Aver.	= 204
				B.M.R.	+ 38·7 %
Partial thyroidectomy after last test. B.M.R. tested 5 months later. Wt. 98 lb.; normal production of CO_2 (c.cm. per min.), 144.					
—	1st	128	2·7	343·0	154·3
	2nd	120	2·6	340·7	148·0
	3rd	116	2·7	338·6	152·3
				Aver.	= 152·0
				B.M.R.	+ 6·0 %
Miss J., 38 yrs.; ht. 65 in.; wt. 111½ lb.; normal production of CO_2 (c.cm. per min.), 149	1st	112	3·2	388·9	207
	2nd	118	3·2	384·4	205
	3rd	110	3·2	375·4	200
	4th	116	3·2	375·4	200
				Aver.	= 203
				B.M.R.	+ 36 %
After rest and sedatives for 3 weeks, B.M.R. retested. Wt. 112 lb.; normal production of CO_2 (c.cm. per min.), 150.					
—	1st	78	3·4	273·9	155·2
	2nd	78	3·4	274·9	155·7
	3rd	78	3·4	275·3	156·0
				Aver.	= 155·6
				B.M.R.	+ 3·7 %
Miss K., 34 yrs.; ht. 65 in.; wt. 121 lb.; normal production of CO_2 (c.cm. per min.), 158	1st	120	3·0	429·0	214·5
	2nd	118	3·0	428·5	214·5
	3rd	120	3·0	432·2	216·0
	4th	122	3·0	432·2	216·0
				Aver.	= 215·0
				B.M.R.	+ 36 %
Partial thyroidectomy one week after last test. Retested three weeks later. Wt. 120 lb.; normal production of CO_2 (c.cm. per min.), 158.					
—	1st	86	2·9	325·1	157
	2nd	86	2·9	320·7	155
	3rd	84	3·0	316·3	158
				Aver.	= 156
				B.M.R.	Normal

TABLE III—RESULTS OBTAINED IN SIX TESTS ON THREE HYPOTHYROID PATIENTS

Subject	Reading (5 min. period)	Pulse	CO_2%	Air breathed per hour (litres)	CO_2 (c.cm. per min.)
Miss L., 49 yrs.; ht. 64 in.; wt. 120½ lb.; normal production of CO_2 (c.cm. per min.), 152	1st	56	4·2	170·9	119·6
	2nd	58	4·2	168·8	118·2
	3rd	54	4·2	168·8	118·2
				Aver.	= 118·6
				B.M.R.	− 22 %
On dried thyroid gr. 2 daily for two months. Wt. 116 lb. normal production of CO_2 (c.cm. per min.), 149.					
—	1st	76	3·6	218·4	131·0
	2nd	76	3·8	190·0	120·3
	3rd	72	3·6	232·0	139·2
				Aver.	= 130·1
				B.M.R.	− 12·7 %
Miss M., 29 yrs.; ht. 65 in.; wt. 99½ lb.; normal production of CO_2 (c.cm. per min.), 145	1st	68	2·6	283·1	122·6
	2nd	68	2·6	287·4	124·5
	3rd	72	2·6	280·9	121·7
				Aver.	= 123
				B.M.R.	− 15·1 %
On dried thyroid gr. 1 twice daily for two weeks, then gr. ½ twice daily for a week and retested. Wt. 96½ lb.; normal production of CO_2 (c.cm. per min.), 141.					
—	1st	72	2·7	300·6	135·3
	2nd	72	2·8	278·4	129·9
	3rd	72	2·8	283·9	132·5
				Aver.	= 133·0
				B.M.R.	− 6·3 %
Miss N., 58 yrs.; ht. 58½ in.; wt. 192 lb.; normal production of CO_2 (c.cm. per min.), 192	1st	52	3·8	186·8	118·3
	2nd	58	4·0	181·3	121·0
	3rd	58	4·2	181·3	127·0
				Aver.	= 122·1
				B.M.R.	− 36·4 %
Put on dried thyroid gr. 1½ for two weeks and retested. Wt. 180¼ lb.; normal production of CO_2 (c.cm. per min.), 184.					
—	1st	80	3·4	230·7	136·7
	2nd	80	3·4	236·0	133·7
	3rd	76	3·4	233·4	132·2
				Aver.	= 132·2
				B.M.R.	− 22%

RELIABILITY OF READINGS

The accuracy of the method may be judged from table I, showing the controls which, with others not here recorded, have been made at fairly evenly spaced intervals during the time I have been using the apparatus. In all the tables the volumes of air and CO_2 are expressed at 0° C. and 760 mm. Hg. By "normal production of CO_2" is meant the figure obtained from the nomogram.

The irregularity of the readings in these three cases was due in the first patient to extreme nervousness, in the second to unavoidable noises from building operations near the test room, and in the third most probably to the extreme heat and stuffiness of the day. In subsequent tests done on these patients a few days after the original tests, Miss P. gave three readings of 189 c.cm., 199 c.cm., and 195 c.cm. of CO_2, with B.M.R.s of + 13%, + 20%, and + 17%, and an average of + 16%. She later developed into a clear case of thyrotoxicosis. Miss R. gave readings of 145 c.cm., 149 c.cm., and 140 c.cm., showing B.M.R.s all within a few points of normal, and Miss S. gave three B.M.R.s of + 8%, + 5%, and + 10%.

DISCUSSION

The apparatus is accurate, easy to use, and comfortable to the patient; in this last respect it is to be preferred to the closed-circuit machines, though the portability of the latter is a point in their favour. The standard of accuracy of results based on O_2 absorption has been questioned by various workers and has been shown by Dr. Poulton to be less exact than that obtained by basing the calculations on CO_2 output. In a private communication to me Dr. Lucy Wills described a series of parallel tests carried out at the Royal Free Hospital by the Douglas-bag method and by Benedict's O_2-consumption method. With normal persons the results by the two methods varied but little, whereas in the case of hyperthyroid patients the values obtained by Benedict's method were higher than those obtained by the Douglas-bag method. This may possibly be due to the stimulating effect of the high oxygen content of the inspired air on these patients. This stimulation is probably of no great significance in a frank case of Graves's disease, but in a functional tachycardia or in an early thyrotoxicosis it is clearly important to aim at the highest degree of accuracy possible within the limits of clinical practice.

Those limits are indeed restricted, for a test lasting longer than twenty-five minutes is too much for the patient, who begins to find immobility irksome and the mask stuffy and oppressive. Restlessness then becomes inevitable, and occasional movements of the head lead to escape of air at the sides of the mask, or sighing breaths to irregular ventilation. The importance of this point has already been discussed, but it must once more be emphasised that, if accurate results are to be obtained, all the factors necessary to secure comfort, muscular relaxation, and steady unhampered respiration must be most carefully regulated. It is particularly on this point of accuracy that I consider this method superior to those more generally employed. Since the figures for each five minutes are separately worked out, variability between them at once discloses an unreliable test and indicates the necessity for a repeat test at a subsequent date. This valuable index of accuracy is not available in the method which involves the use of the Douglas bag.

Finally it must be pointed out that it is possible with this apparatus to work out the respiratory quotient, if it is thought preferable. The gas-analysis apparatus is the standard Haldane pattern, and the oxygen absorbed by the patient can be calculated in the usual way; but it would probably be necessary to make each test last eight to ten minutes to allow time for the double analysis, and the total duration for three or four readings would be at least half an hour. This is a long period for a patient to tolerate the mask and to keep really quiet, relaxed, and still.

I am indebted to the late Dr. E. P. Poulton for his help and encouragement to me through the whole period occupied by this work and for reading the proofs of this paper; to the members of the staff of the South London Hospital for Women for their permission to publish the results of tests done on their cases; and to Mr. A. E. Gould for making the valves to my design.

TABLE IV—RESULTS OF THREE TESTS DONE IN A CASE OF SIMMONDS'S DISEASE (It is hoped that full particulars of this most interesting case, which was under the care of Dr. Rendel, will be published at a later date)

Subject	Reading (5 min. period)	Pulse	CO_2%	Air breathed per hour (litres)	CO_2 (c.cm. per min.)
Miss O., 22 yrs.; wt. 82½ lb.; normal production of CO_2 (c.cm. per min.), 132	1st	48	3·5	181·4	105·8
	2nd	48	3·5	170·4	99·3
	3rd	48	3·6	166·0	99·5
	4th	44	3·7	161·5	99·5
				Aver.	= 101·0
				B.M.R.	− 23·5 %
The second test was done five months later after treatment with Antuitrin S and Progynon. Wt. 80 lb.; normal production of CO_2 (c.cm. per min.), 129.					
—	1st	52	3·3	178·6	98·2
	2nd	52	3·4	174·3	98·7
	3rd	52	3·3	186·4	102·5
				Aver.	= 99·8
				B.M.R.	− 22·6%
The third test was done twenty-two months later, after treatment with whole-gland pituitary by the mouth for three months. Age 24 yrs.; wt. 84 lb.; normal production of CO_2 (c.cm. per min.), 133.					
—	1st	56	3·12	227·9	118·5
	2nd	52	3·19	230·1	118·9
	3rd	52	3·18	236·7	125·3
				Aver.	= 120·9
				B.M.R.	− 9·0 %

TABLE V—RESULTS OF TESTS GIVING VERY IRREGULAR READINGS (Fallacious conclusions might have been drawn, had not each 5-min. test been separately recorded)

Subject	Reading (5 min. period)	Pulse	CO_2%	Air breathed per hour (litres)	CO_2 (c.cm. per min.)	B.M.R.
Miss P., 23 yrs.; wt. 124 lb.; normal production of CO_2 (c.cm. per min.), 166	1st	100	2·8	401·5	187	+ 12 %
	2nd	84	2·8	347·1	162	Normal
	3rd	96	2·5	329·8	137	− 17 %
					Aver. 162	
Miss R., 39 yrs.; wt. 106 lb.; normal production of CO_2 (c.cm. per min.), 146	1st	116	2·9	353·4	170·0	+16·5 %
	2nd	116	2·9	360·0	174·0	+19·0 %
	3rd	112	2·8	343·4	160·0	+ 9·0 %
	4th	100	2·9	357·0	172·5	+18·0 %
	5th	114	2·8	327·0	152·6	+ 4·0 %
					Aver. 166·0	Aver. +13·7 %
Miss S., 65 yrs.; wt. 98 lb.; normal production of CO_2 (c.cm. per min.), 130	1st	108	2·4	380·0	152·0	+15·4 %
	2nd	112	2·4	427·3	170·0	+30·0 %
	3rd	106	2·3	372·0	142·5	+ 9·6 %
	4th	110	2·6	392·0	170·0	+30·0 %
					Aver. 158·6	Aver. +22·0 %

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STREPTOCOCCAL INFECTIONS IN MICE

TREATED BY CHEMOTHERAPY AND SERUM

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A FEW months ago Loewenthal (1939) reported a remarkable experiment in which he had infected 80 mice with a lethal dose of hæmolytic streptococci and divided them into four groups, each of which he treated, after eighteen hours, with one of the following remedies: (1) normal rabbit serum; (2) a sub-effective dose of serum from a rabbit immunised against hæmolytic streptococci (type 13); (3) a single dose of sulphanilamide plus normal rabbit serum; and (4) a single dose of sulphanilamide plus the immune rabbit serum (same dose as in group 2). In this experiment neither the sulphanilamide nor the sera alone protected the animals; but, when the same doses of drug and immune serum were given together, 80 per cent. survived.

This result clearly suggested that in the control of human infections a similar combined treatment might be of great value. In overwhelming septicæmia a far greater curative effect might be obtained by the combined treatment than with sulphanilamide alone; further, it might be possible, in the less severe cases, to reduce the amount of the drug and so diminish the risk of serious toxic effects sometimes attributable to it (Colebrook 1939). There were, however, the following reasons for hesitation before putting this plan of combined treatment into operation in human infections:

(1) The production of sera of high protective power against hæmolytic streptococci is a matter of considerable difficulty. It has so far been accomplished only with a few of the thirty odd serological types, and there is reason to suppose that it may not be successful with all the remaining types.

(2) It would be necessary to employ always a serum prepared from cocci of the same serological type as those with which the patient was infected, because such sera are strictly type-specific in their protective effect. At present we have no means of determining within a few hours (as is the case in pneumonia) the type of streptococcus with which a given patient is infected. Often this requires several days or even weeks. It may well be, however, that in the future this difficulty, like that of producing immune sera, will be overcome.

TABLE I—SURVIVALS AFTER A SINGLE DOSE OF SULPHANILAMIDE ALONE OR OF SULPHANILAMIDE PLUS SERUM

Exp.	Strain	Interval between infection and treatment (hours)	Dose of sulph. and of serum*	Control mice		Sulph. alone		Sulph. and serum		Serum alone	
				A	B	A	B	A	B	A	B
1	Richards	8	20 mg. 0·1 c.cm.	0	3	0	3	3	3	1	3
2	,,	7	20 mg. 0·03 c.cm.	0	4	3	4	3	4	1	4
3	Williams	16	20 mg. 0·02 c.cm.	1	3	2	3	1	3	0	3
4	,,	7	15 mg. 0·03 c.cm.	0	4	2	4	3	4	2	4
5	Goodacre	7	15 mg. 0·03 c.cm.	1	4	1	4	3	4	0	4
6	,,	7	15 mg. 0·03 c.cm.	0	8	3	8	5	8	0	5
7	,,	7	10 mg. 0·03 c.cm.	as above		6	8	4	8	0	5
8	L 193	7	15 mg. 0·03 c.cm.	1	8	1	8	4	8	0	6
			Totals	3	34	18	42	26	42	4	34

A = Mice surviving on fourteenth day. B = Mice used.

* The sulphanilamide (sulph.) was usually given with a stomach-tube and the serum subcutaneously.

TABLE II—SURVIVALS AFTER REPEATED SMALL DOSES OF SULPHANILAMIDE (OR SULPHAPYRIDINE) WITH AND WITHOUT SERUM

In each experiment the interval between infection and first treatment was 7½ hours.

Strain	Doses of drug and of serum	Control mice untreated		Drug alone		Drug and serum		Serum alone	
		A	B	A	B	A	B	A	B
Richards	Sulph.* 4 mg. Serum 0·015 c.cm.	0	5	1	5	1	5	0	5
,,	693 1 mg. Serum 0·015 c.cm.	as above		3	4	2	4	as above	
Williams	Sulph.* 3 mg. Serum 0·02 c.cm.	1	5	0	5	1	5	0	5
,,	M. & B. 693 0·75 mg. Serum 0·02 c.cm.	as above		0	5	2	5	as above	
,,	Sulph.* 3 mg. Serum 0·04 c.cm.	0	8	1	8	1	8	1	8
Goodacre	Sulph.* 3 mg. Serum 0·02 c.cm.	1	5	2	5	3	5	0	5
,,	M. & B. 693 0·75 mg. Serum 0·02 c.cm.	as above		3	5	1	5	as above	
L. 193	Sulph.* 3 mg. Serum 0·03 c.cm.	1	8	5	8	4	8	0	6
Richards	Sulph.* 3 mg. Serum 0·03 c.cm.	2	8	5	8	8	8	7	8
	Totals	5	39	20	53	23	53	8	37

Doses of drug were usually given to surviving mice at 7, 11, 24, 31, and 48 hours after injection.
Doses of serum were usually given to surviving mice at 7, 31, and 48 hours after injection. * Sulphanilamide.

(3) Loewenthal's striking result was obtained with only one strain and the homologous serum. It seemed desirable to make sure that similar results could be obtained with other types and the corresponding sera.

(4) Loewenthal's result was obtained by giving a single large dose of sulphanilamide (20 mg.) and a single dose of serum. A comparable dose of sulphanilamide for man (assessed on relative body-weights) would be 60–70 g. Even a sixth of that amount would be out of the question as a single dose for human beings. It therefore seemed desirable to ascertain whether the same advantage of combining serum therapy and chemotherapy would be obtained when repeated small doses of the drug were employed, as is customary in the treatment of human infections.

EXPERIMENTAL PROCEDURES

Protective sera were prepared by the immunisation of rabbits with four strains of hæmolytic streptococci of different serological type and of high mouse virulence. After determination of the dose of each serum, which was just too small to protect mice when given several hours after an intraperitoneal inoculation of the appropriate strain of streptococcus, this dose was given to a group of such mice along with sulphanilamide either once or on several occasions, as shown in tables I and II. A similar group received the same dose or doses of sulphanilamide alone. A third group received neither drug nor serum. Altogether 334 mice were employed, apart from those used for determining the protective titre of the sera and the virulence of the strains.

Streptococcal strains.—All four strains belonged to Lancefield's group A and had been isolated from cases of puerperal fever. L 193 was the type-13 strain with which Loewenthal had worked; Richards is type 3; Williams type 14; and Goodacre type 12. All of them had been made mouse virulent (M.L.D. not more than 0·00003 c.cm.) by repeated passage.

Production of protective sera.—Two rabbits were immunised with killed cultures of each strain taken in the capsulated phase of growth. The vaccines were prepared as follows: warm moist plates of neopeptone beef-infusion agar, to which 2·5 c.cm. of rabbit's blood and 0·2 per cent. of glucose had been added just before pouring, were planted thickly from a 12-hour serum-broth culture. After three to five hours' incubation, when films showed a large proportion of capsulated organisms (Wright's stain), the growth was washed off with saline, heated in the water bath for 12 min. at 55°–56° C. (after Loewenthal—this sufficed to kill all four strains), diluted to approximately 450 millions per c.cm., and stored in the ice chest without preservative.

One rabbit in each pair was immunised by the sequence of doses employed by Loewenthal—i.e., six or seven intravenous doses at three-day intervals, the quantity increasing from 0·75 c.cm (about 300 million) to 5 c.cm.; and, after a few days' rest, a further series of 5 c.cm. doses. The other rabbit in each pair received 0·5 c.cm. doses intravenously on three consecutive days, then a rest for a few days, than a three-day course of 1 c.cm. doses, another rest, and another course of 1 c.cm.

Six of the eight rabbits produced sera within three or four weeks which, when given in a dose of 0·2–0·4 c.cm., were able to protect mice against 1000–10,000 M.L.D. of culture given into the peritoneum sixteen hours later. Satisfactory sera were obtained by both methods of immunisation, but three or four times as much vaccine was usually required for the Loewenthal system of dosage as for the other method. (Although we have followed Loewenthal in the use of cocci in the capsulated phase and in heating them for only 12 min., our work affords no evidence of the essential importance of either of these details.)

RESULTS

Treatment with a single large dose of sulphanilamide, with and without serum.—Eight experiments were carried out with the four strains and the corresponding sera. Preliminary experiments showed that it was a matter of some difficulty to decide how long an interval should be left between infecting the mice with streptococci and giving the treatment. If it was a little too long, their condition was so bad that no treatment saved them; if it was too short, sulphanilamide alone would save many of them. It was also difficult to decide on the optimal dose of the drug; with the 20 mg. dose, which Loewenthal used, we often found a considerable curative effect without any serum. We therefore used 15 mg. in most of our experiments, and 10 mg. in a few; but even with these doses there was a definite curative effect.

The results showed some variation, but on the whole the combined treatment, with drug plus serum, seemed slightly better than treatment with the drug alone, as regards both survival (for fourteen days) and the average duration of life in each group of mice. Table I gives a summary of the survival-rates in the eight experiments. It will be seen that the advantage of combined treatment was very much less striking than in Loewenthal's experiment. No one strain and serum showed this advantage much more than the others.

Treatment with repeated small doses of sulphanilamide with and without serum.—Nine experiments were carried out, with the results shown in table II. There was no significant difference in the survival-rates for the animals treated with drug alone or with drug plus serum.

DISCUSSION

These results differ from those obtained by Loewenthal in two respects: (1) the greater curative effect obtained with sulphanilamide alone; and (2) our failure to show a greatly increased effect by simultaneous treatment with immune serum plus drug. The greater curative effect of the drug alone in our experiments may well have been due to the shorter interval between infection and treatment of the mice. It is less easy to understand the discrepancy between our results and Loewenthal's in respect of the "synergic" effect of drug plus serum. There is nothing to suggest that the sera we used were much less potent than Loewenthal's, because the data he gives with regard to his sera (partial protection with doses of 0·05–0·03 c.cm. given the day before the streptococci) were almost exactly reproduced in our tests.* It seems more probable that the striking "synergic" effect he obtained was associated with some special character of the strain or the serum he used. (In experiment 8, table I, it is seen that with this same strain, L.193, he also obtained a noteworthy difference between the mice treated with drug alone and those with drug plus serum.)

TABLE III—"SYNERGIC" EFFECT OF SULPHANILAMIDE AND IMMUME SERUM ADDED TO HUMAN BLOOD IN VITRO

Hæmolytic streptococci (Richards) were implanted as shown, into (*a*) normal blood + saline; (*b*) blood + sulphanilamide; (*c*) blood + homologous immune serum; and (*d*) blood + sulphanilamide + serum. In each case the blood constituted 80 per cent. of the mixtures. After incubation on a rotating drum for twenty hours the numbers of streptococci surviving was determined by plate counts in melted blood-agar.

	Number of cocci implanted (shown in parentheses) and number surviving after incubation			
	(160)	(1600)	(16,000)	(160,000)
Blood + saline	Inf.	Inf.	—	—
Blood + sulphanilamide (final concentration 1 in 100,000)	—	121,000	Inf.	Inf.
Blood + immune serum (final concentration 1 in 200)	—	192,000	1,300,000	Inf.
Blood + sulphanilamide + serum ..	—	0	0	30,000

There remains the practical question: Should our policy in treating human infections be to use the combined method? We do not yet know precisely how these chemotherapeutic agents, and the immune sera respectively, affect the streptococci, but it is unlikely that their actions are identical in kind. A priori there is no apparent reason why their effects in the infected human or animal host should not be complementary. Our invitro experiments, like those of Fleming (1938) with pneumococci, suggest that they would be; for, when sulphanilamide plus immune serum were added to human blood, we obtained a greater increase of bactericidal power than by the addition of either agent separately (see table III).

The mouse experiments recorded in this paper however—particularly those in which repeated small doses of the chemotherapeutic agent were used—do not suggest that any important advantage would be gained by combining serum treatment of streptococcal

* We have expressed the titre of our sera as 1000–10,000 M.L.D., making allowance for the inevitable slight irregularity in mouse-protection tests. On several occasions, however, all the animals were protected to the 10,000 M.L.D. level, and the true titre may well have been above that level.

infections with chemotherapy. Since the difficulties of preparing and of using highly potent sera for the many types of hæmolytic streptococci are great, synergic treatment is not advocated. It may be added that, since none of the polyvalent antistreptococcal sera now on the market have any appreciable protective power, there is still less warrant for using them in conjunction with chemotherapeutic agents.

SUMMARY

(1) Mice were infected with four strains of hæmolytic streptococci and some hours later were given a single large dose of sulphanilamide, with or without a subeffective dose of homologous immune serum. Of 42 mice receiving the combined treatment 26 survived; of 42 mice receiving sulphanilamide alone 18 survived.

(2) When, instead of a single dose of sulphanilamide, repeated small doses of sulphanilamide (or of sulphapyridine) were given, with or without serum, the survival-rates were approximately the same in each group. Of 53 mice receiving the combined treatment 23 survived; of 53 mice receiving sulphanilamide (or sulphapyridine) alone 20 survived.

(3) An in-vitro experiment is reported in which the addition of immune serum plus sulphanilamide to normal human blood conferred on it a considerable bactericidal power to hæmolytic streptococci, whereas a similar small addition of each agent separately enabled the blood to exert only a slight bacteriostatic effect.

(4) In the absence of more conclusive evidence from mouse experiments the treatment of human streptococcal infections with serum plus a chemotherapeutic agent is not advocated.

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HODGKIN'S DISEASE

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DURING the last few years interest in Hodgkin's disease has been focused on the implications of Gordon's (1932) discovery that a suspension of affected lymph-gland produces encephalitis on injection into the cerebrum of a rabbit. But, though its diagnostic reliability has been widely and adequately confirmed, Gordon's test has not provided a clue to the identity of the virus or other causal agent. Recent work on the test suggests that it depends on the eosinophilic content of the tissue used.

Any hope of the ultimate establishment of a cause of Hodgkin's disease must necessarily depend on the conviction that there is such a disease, clearly established and definable and presenting regular clinical appearances on which it may be diagnosed. The modern tendency to publish only rare and atypical cases of a disease and the tendency to disguise ignorance by drawing ill-defined but allied conditions into the same complacent net of classification has perhaps cast a doubt on its existence. We feel, therefore, that some homely and clinical observations based on a series of cases of Hodgkin's disease, personally studied and followed up, are of value.

DIAGNOSIS

Our observations are based on 65 cases seen at Guy's Hospital between 1926 and 1937 and reported in detail elsewhere (Baker and Mann 1939), in which the clinical diagnosis was confirmed by biopsy or autopsy, save in 1, in which a positive Gordon's test alone established the diagnosis. These 65 cases include but half of the cases seen at the hospital, which is representative of a large teaching hospital, in which a clinical diagnosis was made; the remainder cannot be used, because no histological confirmation of the diagnosis was obtained. Confidence in the clinical diagnosis is not sufficient, for on biopsy or autopsy we have not infrequently observed it to be misplaced. In our reading of the literature we have also been struck by the lack of certainty of the diagnosis in the many series of cases there reviewed. The absence of reviews of adequately proved cases and the loss of clinical material through lack of proof are to be deplored, lest the clinical identity of the great majority of cases of Hodgkin's disease be lost in the over-emphasis on the rare and bizarre cases to which we have already referred.

SEX-INCIDENCE AND AGE-INCIDENCE

Of our series 47 were males and 18 females; this sex-incidence is amply confirmed in the published reports, where the greater frequency in males has been well established by Burnam (1926), Longcope, Osler, and McCrae (1927), and others. A study of the age of onset in our patients confirms the observations of Desjardins and Ford (1923). The time of onset in half was during the second and third decades; after thirty the incidence of the disease slowly falls, and we observed only 4 cases in which the age at onset was over sixty. The facts that this incidence, computed

TABLE I—AGE AT ONSET OF HODGKIN'S DISEASE

Decade	1st	2nd	3rd	4th	5th	6th	7th	8th
Cases	7	16	16	10	5	7	4	0

for each decade, shows a regular rise and fall (table I), and that the sex-incidence agrees with the many observations of previous writers, demonstrate that our findings are founded on a homogeneous unselected group and therefore constitute a reasonable series from which to draw conclusions.

TUBERCULOSIS

The relationship between tuberculosis and Hodgkin's disease has always been emphasised. Far from its having any ætiological importance, we found that the association of the two diseases was uncommon, an opinion expressed also by other observers. In only 7 of our 65 cases was a history obtained of chronic enlargement of the lymph-glands, usually in the neck, suggesting tuberculosis. Although we found involvement of the lungs relatively common in the course of the disease, in only 1 was pulmonary tuberculosis found. In 1 case death was due to miliary tuberculosis, in which there was a caseating tuberculous gland in the neck. We feel that too much stress has been laid on the relationship between tuberculosis and Hodgkin's disease.

DISTRIBUTION OF THE LESIONS

We were impressed by the great rarity of lymphadenomatous disease in the deep structures without the enlargment of the superficial lymph-glands. In none of our cases were the superficial glands not enlarged at some time during the course of the

disease, and in the great majority this was the presenting physical sign when the patient was first seen. The cervical glands are usually first involved, as is shown in table II. This corresponds to the figures given by Desjardins and Ford (1923), who reviewed 135 proved cases. When more than one group of peripheral glands were enlarged, the cervical group was always among them.

TABLE II—DISTRIBUTION OF ENLARGED GLANDS IN HODGKIN'S DISEASE WHEN THE PATIENT WAS FIRST SEEN

Region	Enlarged glands limited to one region	Enlarged glands in at least one other region than that specified	Total
Cervical ..	Right 20, Left 16, Both 9 } 45	9	54
Inguinal ..	2	6	8
Axillary ..	5	5	10
Mediastinal ..	2	3	5
Abdominal ..	1	0	1
Total ..	55 (or 84%)	9 (or 14%)	—

Involvement of the mediastinal glands and lung parenchyma is common at some stage of the disease: 30 cases out of 65, this being a higher proportion than in previously reported series, possibly owing to better radiological evidence. In 25 of our cases the mediastinal glands were observed to show enlargement during the course of the disease, and, since some of the patients are still alive, the figure ultimately may be expected to be higher. Parenchymatous infiltration of the lung was seen in 16, 11 of whom also showed enlarged mediastinal glands. Three main types are seen: peribronchial infiltration resembling pulmonary tuberculosis; massive involvement of lobar distribution; and discrete nodular deposits radiologically resembling secondary deposits. Pleural deposits were found post mortem in 2 cases, and no case of primary lung involvement or of solitary mediastinal Hodgkin's disease was seen. There were only 3 cases of pleural effusion.

Clinical enlargement of the spleen was observed in 35 out of the 65 and clinical enlargement of the liver in 20. Jaundice is reported to be fairly frequent, but it was found in only 2 of our cases. None of our cases showed disease of the lymphoid tissue of the alimentary tract, nor did we observe lesions post mortem in the renal parenchyma, though 1 patient died in uræmia from ureteric obstruction due to enlarged abdominal glands.

In only 1 case was there a skin deposit of Hodgkin's tissue—a case diagnosed as carcinoma of the breast. Non-specific lesions were present in 12 cases, and in all of them pruritus was a symptom.

The involvement of the central nervous system gives no support for any encephalitic action in the disease in man, the common lesion being an epidural plaque, causing compression of the spinal cord. Signs of lesions of the central nervous system were seen in 8 cases. In 1 of them deposits in the brain, involving cranial nerves, were suggested clinically but were not confirmed by autopsy; the remaining 7 showed spinal cord involvement, and 2 patients died of paraplegia. Several others complained of pains, possibly due to peripheral nerve lesions, late in the disease.

Gross lesions of bone with decalcification appear to be rare; we had no experience of such a condition. One would expect changes in the bone-marrow in this disease, but detailed examination of bone is rarely done post mortem.

BLOOD

There is no blood-picture characteristic of Hodgkin's disease. In 57 of our cases the white blood-count was done at least once during the diease, but the great majority were having deep X-ray therapy. In 16 a leucocytosis of more than 8400 polymorphonuclear cells per c.mm. was observed, and a leucopenia was seen in 4 cases only. An eosinophilia of 5 per cent. or more was seen in 11 cases, and in 2 only was it associated with skin lesions. Immature cells were rarely seen. The red cells were examined in 54 cases, the most constant change being a simple anæmia, 23 cases showing a hæmoglobin of less than 60 per cent. Anæmia was always present in those with general symptoms, such as fever.

FEVER

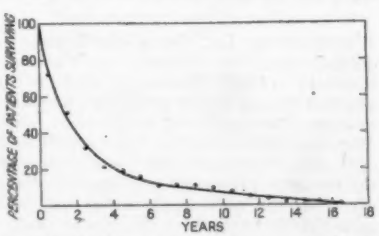
An examination of the patients with fever is of considerable interest. Of 35 with fever, only 3 showed enlargement of the peripheral glands alone; all the others had disease of the mediastinum, lung, or abdominal or central nervous system present. Conversely, of 14 apyrexial patients 13 had the disease limited to the peripheral glands. A Pel-Ebstein temperature was present at some time in 21 of the 35 febrile patients; in only 1 of these was the disease clinically limited to the peripheral glands. The associations of pyrexia with disease of the deep tissues and its absence when the peripheral glands alone are concerned are of great importance in the consideration of treatment and are mentioned under that heading.

GENERAL COURSE

The rare types of Hodgkin's disease were rarely encountered in our series; when present they only emphasised the similarity of the remainder. We have been struck by the constancy of the clinical picture. Though characteristic features may be absent at any one stage, they will be seen if the course is reviewed as a whole. In the absence of these features, especially enlargement of the superficial lymph-glands, a diagnosis of Hodgkin's disease will probably be wrong.

MODE OF DEATH AND DURATION OF LIFE

In 29 of our fatal cases the mode of death is known. In 14 cases it was associated with disease of the lungs and mediastinum, which may be responsible for the impression, which we discount, that Hodgkin's disease is followed by tuberculosis; in only 2 was tuberculosis present. In 3 cases death was due to involvement of the nervous system of which 2 were associated with paraplegia, and 1 with coma, and in 10 to exhaustion with gross anæmia.



Graph showing the number of patients surviving at the end of each year after the onset of Hodgkin's disease.

The average duration of the disease cannot be worked out by taking a simple average, for the following reasons: (1) some of the patients are still

alive; (2) they came under review at different times during the period 1926–37; and (3) trace of 4 has been lost. We have, however, described a method by which the expectation of life may be evaluated (Baker and Mann 1939). The average length of survival is eighteen months. The accompanying figure shows the number of patients surviving at the end of each year after the onset of the disease. This survival-rate is very much better than that given by Desjardins and Ford (1923) for a series of cases between 1915 and 1925, of which only 11 per cent. were alive after three years. This may be explained by the fact that our patients were receiving, in the great majority of cases, systematic treatment with deep X rays, the value of which is amply demonstrated by these figures.

TREATMENT

The most striking fact that emerges from a study of these cases, and one which we wish to emphasise, is that 2 patients have been cured. In only 4 of our patients were the diseased glands excised; in 3 of these the disease was apparently limited to the superficial glands. Of these 3 patients 1 left hospital well, and it has been impossible to trace her; but the other 2 are alive and well, showing no trace of the disease today, one of them ten, and the other twelve years after diagnosis and operation. In both of these cases the histological material has been re-examined by Prof. G. W. Nicholson, who also examined most of our biopsy material, and the original diagnosis confirmed. These 2 cases are of the greatest importance, for no other patients have recovered, and we have found no similar record anywhere. In both of these cases, excision of glands was followed by systematic deep X-ray therapy. We therefore urge that all patients with Hodgkin's disease in whom there is apparent limitation of the disease to the superficial glands, in whom there is no evidence of splenic or other abdominal involvement, and in whom radiography of the chest shows no abnormality, should be subjected to surgical removal of the diseased tissue and should subsequently receive deep X-ray therapy. The fact that fever is unusual when the disease is so limited may assist in selecting the cases for operation.

SUMMARY

(1) A series of 65 proved cases of Hodgkin's disease is reviewed.

(2) A confident clinical diagnosis must be confirmed by biopsy.

(3) Hodgkin's disease is a definite clinical entity, running a characteristic course. In most cases enlargement of the cervical glands is the first sign, and this is followed at a variable date by enlargement of other glands and involvement of deeper structures. Involvement of the deeper structures without enlargement of the superficial glands is rare.

(4) Fever is unusual when superficial glands are alone involved but is the rule when the deeper structures become affected.

(5) Mediastinal glands and lungs are often affected in the course of the disease, and it is to pulmonary complications that death is often due.

(6) Tuberculosis is neither a factor in the ætiology of the disease nor a common association.

(7) A third of the patients diagnosed may expect to live three years with deep X-ray therapy, although the average survival is eighteen months.

(8) Cure was effected in 2 cases after surgical excision of glands combined with deep X-ray therapy. It is suggested that more patients might be cured if this treatment were used early.

We wish to express our thanks to Dr. E. T. Conybeare, who began the follow-up of these cases; to Dr. Frank Knott and to Dr. R. L. Waterfield for the hæmatology; to Dr. Watt and subsequently to Dr. Carter Braine for the use of the X-ray therapy records; to those members of Guy's Hospital staff under whose care these patients came; and to Prof. G. W. Nicholson.

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EXCRETION OF SULPHAPYRIDINE
(M. & B. 693)

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THE work here reported deals with the fate of sulphanilamido-pyridine after ingestion by two women with puerperal fever and by one normal man. Baines and Wien (1939) and Schmidt and Hughes (1939) recovered about 70 per cent. in the urine after a single dose and suggested that the balance might be found in the fæces. Marshall and Long (1939) have commented on the variable absorption, and Stokinger (1939) recovered 15–85 per cent. from the urine after repeated doses. My object was to repeat their work, to examine the fæces, and to ascertain if any oxidation products similar to those of sulphanilamide could be detected.

EXAMINATION OF URINE AND FÆCES

Since many patients had already received sulphanilamide before admission to hospital, only patients whose blood and urine gave negative results when tested for compounds of the sulphonamide group before the start of sulphapyridine treatment were used. Urine and fæces were collected from three patients and investigated by the methods of Baines and Wien (1939). It was found necessary to extract the fæces by warming them with a 10 per cent. solution of caustic soda, owing to the insolubility of the drug in water. Table I contains the data of recovery of the drug. Case 2 had diarrhœa, causing the urine and fæces to be mixed, but by determining the amount of creatinine, and hence of the urine, it was possible to estimate the amount of sulphapyridine excreted in the fæces. Case 3 (the man) complained of nausea, depression, apprehension, and insomnia, and his pulse-rate varied.

TABLE I—EXCRETION OF SULPHAPYRIDINE IN MAN

Case	Dose	Sulphapyridine recovered				Excretion complete in
		From urine		From fæces	Total percentage recovered	
		Free (g.)	Total (g.)	Total (g.)		
1	14 g. in 5 dys.	6·9	12·9	0·3 (2·1%)	94·3	8 days
2	16 „ 6 „	3·2	7·2	5·3 (33·1%)	78·1	12 „
3	6 „ 1 dy.	4·4	5·3	0·7 (12·5%)	100	5 „

TABLE II—EXCRETION OF SULPHAPYRIDINE IN MICE AFTER A SINGLE DOSE

Days	Average amount (mg.) sulphapyridine recovered per mouse					
	After administration of a single dose of 15 mg.			After administration of a single dose of 7 mg.		
	From urine		From fæces	From urine		From fæces
	Free	Total	Total	Free	Total	Total
1, 2	6·1	8·3	0·3	2·4	3·8	3·3
3, 4	0·8	1·0	0·2	1·1	2·1	0·1
5, 6, 7	1·7	1·8	Nil	0·1	0·4	Nil
8, 9	0·8	1·0	,,	Nil	0·2	,,
10, 11	0·4	0·6	,,	,,	Nil	,,
12, 13	0·5	1·0	,,	,,	,,	,,
14, 15, 16	Nil	0·4	,,	..	..	..
17, 18	,,	Nil	,,	..	..	..
Totals	10·3	14·1	0·5	3·6	6·5	0·4
		14·6 (97·3 %)			6·9 (98·6 %)	

Estimation of sulphapyridine in normal fæces.—The fæces of case 3 were examined two months after sulphapyridine therapy. They were collected in 24-hour specimens, for four days. In none of the specimens was it possible to detect a substance which would diazotise and couple when subjected to the method of extraction described above. An examination was also made of 24-hour specimens obtained from five normal females who denied that they had received any drugs of the sulphonamide group. Again no chromogenic substance was found.

Animal experiments.—A suspension of sulphapyridine in gum saline was administered by mouth in single doses to two groups of six non-infected mice, whose urine and fæces were collected and examined daily. The results are shown in table II.

Solutions of sulphapyridine were administered by mouth to each of two groups, six non-infected mice in five doses spread over thirty-six hours. This resembles the method by which the curative value of a drug is assessed in the Bernhard Baron Research Laboratories. The urine and fæces were collected and analysed as before. The results are shown in table III.

TABLE III—EXCRETION OF SULPHAPYRIDINE IN MICE AFTER REPEATED DOSES

Days	Average amount (mg.) of sulphapyridine recovered per mouse					
	After administration of five doses of 5 mg. (total 25 mg.)			After administration of five doses of 1 mg. (total 5 mg.)		
	From urine		From fæces	From urine		From fæces
	Free	Total	Total	Free	Total	Total
1, 2,	11·7	11·8	2·0	2·1	2·3	0·4
3, 4	1·1	2·1	1·0	0·4	0·6	0·1
5, 6, 7	0·8	1·0	0·7	0·1	0·2	0·1
8, 9	0·5	0·8	0·5	Nil	0·2	Nil
10, 11	0·3	0·5	0·1	,,	0·1	,,
12, 13	0·4	0·6	Nil	,,	Nil	,,
14, 15, 16	Nil	0·3	,,	,,	,,	,,
17, 18	,,	Nil	,,	,,	,,	,,
Totals	14·8	17·1	4·3	2·6	3·4	0·6
		21·4 (85·6 %)			4·0 (80 %)	

EXAMINATION OF VOMIT

Some patients vomit after continuous dosing with the sulphapyridine; samples of this vomit were obtained whenever possible for examination, and the findings are summarised in table III.

Since in case 4 the drug was injected intravenously and later recovered from the vomit, it follows that sulphapyridine is excreted into the alimentary canal. Three of the four other specimens were obtained a sufficiently long time after ingestion of the drug for the stomach to empty, and in two of these samples acetyl derivative was found demonstrating excretion. The paucity of bile found suggests that the drug probably enters the stomach directly rather than through the bile-duct and by regurgitation from the duodenum.

EXAMINATION FOR OXIDATION PRODUCTS

No oxidation products similar to those of sulphanilamide were found; this may be due to the drug being more difficult to oxidise. When eight patients treated with sulphanilamide were excreting these compounds, the average ratio of inorganic to ethereal sulphates was 3·3; four patients receiving sulphapyridine gave an average of 9·3, the average for normal people usually quoted being 10.

TABLE IV—SULPHAPYRIDINE IN VOMIT

Case	Method of administration	Total dose (g.)	Vomit			Bile
			Time after last dose	Sulphapyridine (mg. per 100 c.cm.)		
				Free	Total	
4	Intravenous	9	1 hour	6·0	6·0	+
2	Oral	5	4 hours	11·0	18·0	—
5	,,	4	3 ,,	5·4	5·0	† +
,,	,,	9	½ hour	15·9	16·0	—
,,	,,	9	24 hours	16·0	20·0	—

DISCUSSION

Because of the method of extraction from the fæces it was impossible to differentiate between free and acetyl sulphapyridine, but the recovery of the acetyl compound from the vomit in two cases suggests that it may also be found in the fæces.

No oxidation products similar to those of sulphanilamide were found by direct examination, and the sulphate ratio of the urine was almost normal. Patients who had received sulphanilamide and excreted oxidation products had a lower sulphate ratio, for some of the hydroxyl compounds produced by this oxidation appear to be excreted in conjunction with sulphate, thus increasing the quantity of ethereal sulphate present in the urine.

Methylation of the pyridine radical in detoxication has been shown to take place after administration of pyridine, nicotinic acid, and quinoline to dogs, rats, and rabbits, the methyl group attaching itself to the nitrogen atom of the ring system, leaving the amino group free to be estimated. Because of this no evidence can yet be advanced that this form of detoxication takes place with sulphapyridine.

The toxic effects appear to be central; this is probably the cause of the vomiting seen in some cases.

SUMMARY

Sulphapyridine is excreted both free and combined in the urine of patients receiving the drug, the excretion continuing for several days after repeated doses. Including the amount present in the fæces, probably due to non-absorption, about 90 per cent. may be recovered. The drug has also been recorded from the vomit after oral or intravenous administration, but oxidation products are not so easily formed as in the case of sulphanilamide.

My thanks are due to Dr. L. Colebrook for the animal experiments and to Messrs. May and Baker Ltd. for a supply of sulphapyridine.

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SUPRARENAL CORTICAL EXTRACT IN ACUTE CONFUSIONAL STATES

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SUPRARENAL cortical extract has been used successfully in the treatment of Addison's disease (Wilkinson 1937, Greene 1937); marasmus, on the ground of a possible relation between chronic infection, asthenia, and hypofunction of the suprarenals (Hislop 1938); enteric fever, together with vitamin C (Najib-Farah 1938); and mild subclinical suprarenal cortical insufficiency (Gordon, Sevringhaus, and Stark 1938). Najib-Farah noted the common development of symptoms resembling those of suprarenal insufficiency during the course of typhoid fever.

We have used suprarenal cortical extract in the treatment of acute mental confusion in connexion with typhoid fever. Mental confusion is met with either in the first stage of the fever—and is then always of serious import—or, more commonly, in the later stage and during convalescence. In the latter event the confusion, although less acute, may continue for weeks and months and bring on fatal exhaustion.

CASE-RECORDS

CASE 1.—A man, aged 40, was admitted to hospital with a history of fifteen days' fever, headache, and a few days' increasing mental disturbance, with restlessness, incoherence, and insomnia. On admission he was delirious, picked at his bed, imagined himself at home, and thought that the doctor and other persons were relations and fellow tribesmen. He complained of pain all over the body. He had a pale yellow complexion, was wasted, and sweated profusely. The temperature ranged between 100° and 102° F. The pulse was feeble, its volume small, and its rate slow in relation to the temperature. The spleen was just palpable, and the liver was enlarged and tender. There was congestion at both bases of the lungs. Serological investigation showed agglutination of *B. typhosus* in a dilution of 1 in 960.

Suprarenal cortical extract (Cortigen) 2 c.cm. with vitamin C (Redoxon) was given daily intravenously. No other treatment was given, except to relieve the congestion in the lungs. After the second day the patient began to clear mentally, was more easy to manage, slept better, and became oriented. The fever ran its natural course, and after fourteen days in hospital the patient was discharged in good mental and physical condition.

Three similar cases were treated successfully on the same lines, one of them a boy, aged 10, who had, besides the confusion, epileptic fits probably due to the low blood-pressure (systolic 70). Both confusion and fits cleared with this treatment.

One case of confusion in the first stage of the fever was treated successfully on the same lines.

CASE 2.—A nervous girl, aged 17, was, on the day before her present illness, very depressed, refused food, and then developed a high fever with a temperature of 104° F. There was no shivering. At the same time she became confused, was restless in bed, standing up and speaking continuously and incoherently, mostly about fantastic ideas of heaven and of strange women entering the house. She was in poor bodily condition and of a pale complexion. The spleen was enlarged, and blood examination showed a moderate degree of leucopenia and the absence of malarial parasites. A tentative diagnosis of enteric fever was made, which was later confirmed serologically as typhoid.

Treatment was with suprarenal cortical extract and vitamin C, as in case 1. She continued on the extract and vitamin C every third day during the whole course of the disease. The condition began to clear up from the second day, and hours of confusion began to alternate with lucid intervals. The next day it cleared up completely, remaining so till the end of the illness, which was very serious, and is now in normal convalescence.

These five cases and that of Hislop led us to try this treatment on other cases of mental confusion where hypofunction of the adrenal glands could be suspected. Mental confusion in the puerperium after a prolonged difficult labour, infection, postpartum hæmorrhage, and poor bodily condition suggested itself for such treatment. We have treated four cases of such confusion on these lines, with dramatic recoveries. One of these cases is worth noting.

CASE 3.—A young woman, aged 18, was seen on the twelfth day after giving birth to her first child. She had had a severe postpartum hæmorrhage. She was very pale and anæmic, looked anxious, had no idea of her surroundings, tore at her hair, and could only be controlled with great difficulty, singing at one moment and abusive at another.

Treatment with suprarenal cortical extract (Cortin, Organon) was instituted immediately in doses of 4 c.cm., administered intravenously with vitamin C. That same night the patient slept soundly with no sedatives, and she awoke next morning in a greatly improved condition, except for great fear, and after three days' treatment she was absolutely clear mentally.

An attempt to treat other confusional states of indefinite origin, which are common in the hot weather, has proved disappointing.

This simple treatment appears to us a useful weapon to combat a serious and very undesirable complication of a body illness. It also suggests that mental confusion may sometimes be due to hypofunction of the suprarenals.

SUMMARY

(1) Five cases of acute confusion developing during typhoid fever have been treated successfully with suprarenal cortical extract and vitamin C.

(2) Four cases of mental confusion in the puerperium after prolonged and difficult labour and

severe postpartum hæmorrhage responded well to this treatment.

(3) Other confusional states of indefinite origin did not respond.

(4) It seems to us that low blood-pressure, pale yellow complexion, and asthenia are the best clinical indications.

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A COAGULATIVE SERUM

PREPARED BY INJECTING HIRUDIN INTO ANIMALS

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HIRUDIN, extracted from the head of the leech, acts as a lymphagogue and is used in laboratory experiments for retarding coagulation of the blood. We have, however, used it successfully in the preparation of a serum which hastens the coagulation of blood.

Cowie (1911) gave repeated injections of hirudin to rabbits and Vera and Loeb (1914) to mice, and found that substances developed in the serum which counteracted the retarding influence of the hirudin on the coagulation-time of the blood—i.e., the rabbits and mice became hirudin-resistant during the treatment. Cowie explained this by suggesting that an anti-antithrombase is formed which counteracts the antithrombic effect of the hirudin. We consequently tried to produce in the serum of a rabbit, by repeated injections of increasing doses of hirudin, a substance capable of accelerating the coagulation of the blood of a normal animal.

TABLE I—CHANGE IN COAGULATION-TIME AFTER INTRAVENOUS INJECTION OF SERUM FROM RABBITS TREATED WITH HIRUDIN

Rabbit No. 2		Rabbit No. 4	
Time of day	Coagulation-time of blood	Time of day	Coagulation-time of blood
3.45 P.M.	5 min. 10 sec.	3.50 P.M.	3 min. 30 sec.
3.47 ,,	Injection given	3.55 ,,	Injection given
4.15 ,,	50 sec.	4.10 ,,	2 min. 20 sec.
4.45 ,,	50 ,,	4.27 ,,	40 sec.
5.35 ,,	45 ,,	4.35 ,,	50 ,,
8 ,,	45 ,,	4.55 ,,	50 ,,
4 A.M.	5 min. 15 sec.	6 ,,	4 ,,
		7.30 ,,	55 ,,

TECHNIQUE

We used the Leipzig Sachse factory's preparation, which is sold in the form of a grey crystalline powder in soldered glass tubes. In every instance we injected the hirudin, dissolved in 1·5–3·0 c.cm. of tepid physiological salt solution, into the marginal vein of a rabbit's ear.

For determining the coagulation-time we employed the simple and reliable method of Kentzler and Kallós (1925), taking care that the blood to be examined should spurt out spontaneously in one drop from a larger vein, so that no lymph should mix with it. This method is as follows:—

The blood being allowed to drip into a capillary glass tube 10–15 cm. long at intervals of 10–15 sec., pieces of about 1–2 cm. long are broken off till a thin fibrous thread extends from the remaining part of the tube. The time from the spurting out of the drop of blood till the appearance of the fibrin thread gives the coagulation-time.

The coagulation-time for rabbit's blood at room temperature proves by this method to average 2½–3 min.; but often the coagulation-time was 7–8 min. and sometimes even more, or, on the contrary, 1 min. or less.

We gave the rabbit daily, or every second day, injections up to 5 mg., increasing the dose later to 50 mg., till we had injected a total of 0·3 gr. On an average the animals received sixteen injections, and during the treatment abundant observations were made with regard to the coagulation-time.

TABLE II—COAGULATION-TIME AFTER INTRAVENOUS INJECTION OF NORMAL RABBIT SERUM

Rabbit No. 1		Rabbit No. 3	
Time of day	Coagulation-time of blood	Time of day	Coagulation-time of blood
12.20 P.M.	8 min. 20 sec.	3.55 P.M.	1 min. 10 sec.
1.5 ,,	Injection given	4 ,,	Injection given
1.40 ,,	6 min. 10 sec.	4.15 ,,	2 min. 1 sec.
3 ,,	8 ,, 30	4.35 ,,	3 ,, 1 ,,
		4.55 ,,	3 ,, 30 ,,
		6 ,,	2 ,, 20 ,,

RESULTS

After the injections we observed that doses of 50 and 100 mg. caused a strong reaction. The rabbit began to cower and tremble and became dyspnœic, while its fur stood on end and its temperature rose 2°–3° F. Its ears were cold and bluish-grey, and its blood-vessels contracted, so that a prick-wound hardly bled, though the blood did not coagulate. The blood was dark, nearly black. Although this condition passed off after an hour or two, the animal recovered only slowly, and it had so little appetite that often it took no nourishment next day.

On the other hand, if we accustomed the rabbit to hirudin gradually, doses of 50–100 mg. caused no general reaction. Thus our experiments confirm the reports that immunisation against hirudin can be produced. When we injected the hirudin into the veins of the rabbits that had already been treated, we saw no general reaction; so antihirudin may have been formed in the treated animal. This suggestion is supported by the fact that half an hour after the injection of hirudin the coagulation-time was only 8 min. and after an hour only 1 min. 45 sec., whereas in the untreated animal after an injection of 50 mg. of hirudin the blood does not coagulate even hours afterwards. An hour after the injection of 100 mg. of hirudin the coagulation-time of the immunised rabbit was 60 min., whereas in the control rabbit coagulation had not taken place even after 9–10 hours.

Although, therefore, we can make the rabbit hirudin-resistant, the immunisation is only partial as regards retarding the coagulation; but it progresses in proportion with the quantity of the doses

and the duration of the treatment. Hirudin, at most, causes some prolongation of the coagulation-time and an earlier setting-in of this prolongation in the inoculated animals.

If we inoculate healthy untreated rabbits intravenously with 0·5–3·0 c.cm. of the blood-serum of immunised rabbits, we can observe a decided change in the coagulation-time of the blood. In 8 cases, with 7 different animals, we succeeded in shortening in a great degree the coagulation-time for several hours (table I).

When the control inoculations were carried out with blood-serum from animals not treated with hirudin, no such decided shortening of the coagulation-time was noticeable (table II).

CONCLUSIONS

Repeated injections of hirudin into rabbits makes their blood resistant to the ordinary anticoagulative effects of this substance. The serum of animals thus immunised, when added to blood from other animals, accelerates coagulation. The action of this "immune" serum on coagulation is much more powerful than the action of normal serum. Smaller quantities can therefore be used and troublesome secondary effects are correspondingly less likely.

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CLINICAL NOTES

PAROXYSMAL TACHYCARDIA

IN AN INFANT AGED SIXTEEN MONTHS

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TACHYCARDIA of over 280 beats a minute appears to be exceedingly rare. Lyon reported a case in 1937 and found only sixteen others in the literature. His own case, with a rate of 310–313 beats a minute, was the fastest up to that time recorded for the human heart. Lewis (1921) concluded from experiments on animals that the fastest possible rate of the mammalian heart was about 300 beats a minute. Campbell (1937) reported three cases of tachycardia in infancy, one of which had a rate of 300 beats a minute and was not included in Lyon's (1937) review. The case reported below shows a heart-rate, supported by electrocardiographic tracings (see figure), of 340 beats a minute in an infant aged sixteen months, with complete recovery. It appears to be the fastest rate that the human ventricle has been observed to beat.

CASE-RECORD

I was called on July 15, 1936, to see a female infant aged sixteen months. Three days before the bowels had moved three times, which was unusual for the child. The next morning she had vomited, and during the day she had had several motions but continued to play about very much as usual. That afternoon she became somewhat drowsy, and it was noticed that there was a fluttering in the child's neck. Next day she was still drowsy and the fluttering continued.

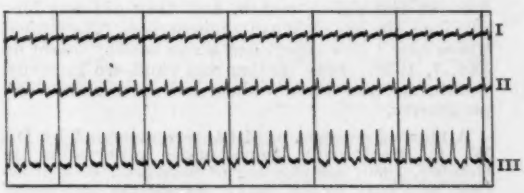
When I was called in, the child was quiet and listless and took no interest in her surroundings. The most obvious thing was the very rapid fluttering in her neck. She was pale, and there was no cyanosis. The apex-beat was in the fourth interspace ½ in. outside the nipple line. The rate appeared to be regular and was much too fast to count. The heart sounds seemed to be of good quality, and there were no bruits. The liver was not enlarged. The temperature was 99° F. She was at once admitted to hospital.

The rate appeared to remain the same on the 17th, 18th, and 19th. On the 20th the rate at the apex was slower, and the notes made on the 24th mention "clinically normal beats followed by short runs of extra-systoles." From then on the progress was uneventful.

Radiography of the chest on the 15th showed "enlarged heart shadow." There were no pathogenic organisms in the fæces. A slight trace of albumin was present in the urine. The mild pyrexia at the beginning of the illness persisted for several weeks, even though the child appeared to be well.

Subsequent history.—She was not discharged till Feb. 18, 1937, because of a vaginal discharge which had developed while in hospital. On Feb. 25 I was sent for urgently and found the child in exactly the same condition as on the previous occasion. The history was similar. The previous night she had vomited and had had several loose motions. The parents refused to allow the child to go to hospital. At 2.30 P.M. the heart was beating normally. I was told that the fluttering had persisted for two hours and then stopped suddenly, when the child went to sleep.

On a later occasion the mother complained that the left foot turned in on walking and on several occasions had nearly caused the child to trip. The left foot was colder than the right, and the left calf was about ½ in. smaller in circumference than the right. Seen recently the child appears to be normal, healthy, and well developed. There is no difference between the two legs.



Electrocardiogram showing a heart-rate of 340 beats a minute (the vertical lines are intervals of a second).

ELECTROCARDIOGRAMS

Several electrocardiograms were taken while the child was in hospital. The first, taken at 4.30 P.M. on July 15, 1936, shows a hitherto unrecorded ventricular rate of 340 beats a minute (see figure). The time recorder was tested and found to be correct. The interpretation of the electrocardiogram is always a most difficult matter in excessive rates. In Lyon's (1937) case he obtained different diagnoses from leading European and American cardiologists and found no uniformity in their opinions. Campbell (1937) in a similar case considers that the diagnosis may lie between paroxysmal auricular tachycardia and paroxysmal auricular flutter, and he inclines to the former.

SUMMARY

(1) A case of paroxysmal tachycardia with a rate of 336–340 a minute is reported in an infant aged sixteen months, with complete recovery.

(2) Some gastro-intestinal upset preceded the attack.

(3) After the return of the heart beat to normal rate on the first occasion pyrexia of a mild degree persisted for several weeks.

(4) An attack of tachycardia of two hours' duration occurred some months later apparently as the result of a gastro-intestinal upset.

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SUCCESSFUL PREGNANCY IN OLD-STANDING PERNICIOUS ANÆMIA

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THE history of the association of pregnancy and pernicious anæmia is an unhappy one. Pregnancy is a causal factor, and before the introduction of liver therapy the anæmia was usually fatal. This state of affairs has been altered, but I have not noticed a record of successful pregnancy in any old-standing case.

It is obvious that childbirth in pernicious anæmia can never be common, for the incidence of that disease is comparatively rare till after the childbearing age. During the past ten years I have seen only two established cases of pernicious anæmia in which pregnancy has taken place. One patient had twins born at the eighth month, and they did not long survive; she has since had a miscarriage. The patient whose case I now report had a fine healthy infant on Jan. 1, 1939. Both mother and child are in robust health, and the infant's blood has never shown any peculiarity.

A married woman, aged 34, recommended by Dr. W. F. MacDonald, came under observation in October, 1930, complaining of weakness, breathlessness, and pain in the back. Symptoms had begun shortly after her marriage two and a half years before. It was also noticed that her complexion had a yellow-brown tinge, which was more obvious just before and during her periods. She had occasional sore and rough areas on her tongue and gums. A year later she had transient tingling and numbness in her toes. She became breathless and suffered from nausea. She had no previous illness of importance, family history was satisfactory, and surroundings were healthy.

On Oct. 4 her red corpuscles numbered 1,500,000 per c.mm., her hæmoglobin was 31 per cent., and her leucocytes numbered 5200. The red corpuscles were macrocytic and hyperchromic. She was treated with a preparation of hog's stomach and on Oct. 21 had 4,200,000 corpuscles, with hæmoglobin 69 per cent. On May 6, 1931, she had an abortion, and her hæmoglobin fell to 64 per cent., but two months later was 82 per cent. Since that time she was treated successively with Marmite, whole liver, and liver extract by mouth till April, 1935. About that time she became deeply pigmented, and she complained of tingling in her fingers.

Treatment with Pernæmon Forte 5 c.cm. by intramuscular injection was instituted. Because of its smaller dosage, Anahæmin 2 c.cm. once a month was substituted in November, 1936, and that has been the main treatment ever since. In August, 1938, a positive Aschheim-Zondek reaction was obtained. Hæmoglobin tended to fall, and anahæmin 2 c.cm. was injected once a fortnight. On Dec. 26 she was admitted to the maternity ward of the Deaconess Hospital, and Dr. Douglas Matthew, assistant gynæcologist, has kindly given me notes, of which the following is an abstract.

On admission.—Age 42. Pigmented dry skin. Blood-pressure 170/90. Slight œdema of ankles. Full time pregnancy, vertex L.O.A. Fœtal heart 120, regular. Treatment begun with anahæmin 2 c.cm. daily by intramuscular injection.

Progress.—Dec. 30: red blood-cells 4,200,000; hæmoglobin 60 per cent; quinine and pituitary given; weak irregular contractions of uterus, followed by spontaneous delivery on Jan. 1 after episiotomy; placenta retained; signs of shock after an hour; improved after transfusion; no improvement in uterine contractions; further hæmorrhage; further transfusion. Gas-and-oxygen anæsthesia to remove placenta. After ergometrine and pituitary the hæmorrhage stopped.

Jan. 3: hæmoglobin 48 per cent., red corpuscles 1,900,000. Jan. 11: hæmoglobin 62 per cent.

Progress thereafter was uneventful. On Oct. 18, 1939, the hæmoglobin was 94 per cent.

ARTERIAL EMBOLECTOMY

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THE operation of arterial embolectomy, though sometimes anatomically awkward, is usually not difficult and is not shock producing. That early arterial embolectomy is the operation of choice is unchallengeable; delay will often leave the tissues beyond the block permanently injured, even though the obstructing factor be completely removed; delay also helps in the formation of a secondary thrombus which brings with it attendant operative difficulties and diminishes the chance of obtaining a patent artery. The following case illustrates the simplicity of the operation and the perfect return of function following such treatment.

CASE-REPORT

A. B., a housewife of 57 years, was admitted to the Highgate Hospital on Feb. 22, 1939, with dyspnœa on exertion for six months and cardiac asthma. On admission she showed no respiratory distress and her respiration-rate was 26 per minute. Her face was flushed but not cyanosed. Her apex-beat in the sixth space was 6 in. to the left of the mid-sternal line. The impulse was forceful, diffuse and irregularly irregular. There was no dullness to the right of the sternum. The first sound at the apex was accentuated and followed by a short unconducted systolic murmur. The second sound at the apex was followed by a low rumbling diastolic murmur, localised to an area the size of half a crown 1 in. medial to the apex-beat. The second sound was reduplicated; no aortic diastolic murmur was detected. The pulse was irregularly irregular and its rate about 120 per minute. The radial artery was thickened and tortuous. The blood-pressure was 235/120. Examination of the lungs, abdomen and central nervous system revealed no gross abnormality. A catheter specimen of urine contained a little protein, some red, pus and epithelial cells and one or two cellular and hyaline casts. An X ray of the chest showed moderate dilatation of the aorta and enlargement of the heart in the transverse diameter. An electrocardiogram showed auricular fibrillation and left axis-deviation. A diagnosis of mitral stenosis, hypertension, congestive failure and fibrillation was made.

Progress.—She was given tinct. digitalis with excellent results; her pulse-rate fell to between 75 and 80 per minute, but still remained irregular. With rest in bed her blood-pressure fell to 165/85. Her improvement was steady and uneventful until

March 15 when at 3.30 P.M. she suddenly complained of a severe pain in her right arm, extending from the middle of the arm to the hand, followed by a tingling sensation, numbness and a feeling of uselessness of the arm. When seen by one of us (W. P. C.) at 3.45 P.M., the arm below the elbow was cold, useless and had a bluish mottled appearance. The axillary artery could be felt pulsating in the axilla but no pulsations were detected below that level. Pressure along the course of the brachial artery revealed considerable tenderness. Later the arm became pale, completely paralysed and insensible, whilst the pain remained as severe as it was initially. The site of maximal pain was from the elbow to the wrist midway between the radial and ulnar borders of the forearm. The severity of the pain may be judged by the fact that the patient begged us to remove the arm "or do anything to relieve" her.

Operation (N. C. T.).—The patient was given paraldehyde ʒ vi in saline rectally and taken to the theatre at 6 P.M. With arm abducted the line of the upper brachial and lower axillary artery was infiltrated with 1 per cent. Procaine and the termination of axillary and commencement of brachial artery exposed. Normal pulsation was felt in the axillary artery as far down as its subscapular branch; below this for 6 cm. it was firm and contracted and was felt to contain solid material, whilst further down the artery was empty and contracted. Thin rubber tubing was passed round the vessel below and above the area where the embolus was felt, and held by assistants. From now onwards all instruments used were kept in 3·8 per cent. sodium-citrate solution and the wound was sprayed frequently with citrate solution. An incision 2 cm. long was made over the clot and pale firm thrombus was exposed. This was broken in the centre with forceps, and then the clot was expressed in two parts by pressure towards the arterotomy opening. It was now found that the rubber did not completely occlude the proximal end of the artery unless the assistant's fingers held the tubing close to the artery. The reason for this was the incomplete exposure of the middle part of the axillary artery. On loosening the lower rubber band blood did not flow and so a gentle stroking pressure was exerted from the antecubital fossa up to the incision in the artery—this resulted in the expulsion of soft dark secondary thrombus, following which the artery gently oozed. Slight loosening of the upper rubber band resulted in a vigorous blood spurt from the wound. The artery was now closed with a row of mattress sutures of paraffined "arterial" silk, reinforced by a layer of interrupted sutures. On releasing the bands the artery pulsated vigorously, the radial pulse returned, and the hand soon became pink and warm. A stout length of silk was placed round the artery above the subscapular branch, and its ends left long—for use in the event of secondary hæmorrhage. The skin wound was closed, leaving the silk ends outside and the patient returned to bed. The clot was reassembled and found to be pale, firm and irregular, 5·6 cm. long and varying in diameter from 0·4 cm. to 0·7 cm. On waking from the paraldehyde the patient felt no pain in her arm.

Post-operative progress.—Her subsequent course was as follows: March 16, right hand warm and pink; all movements of elbow and hand performed though rather weakly; artery was pulsating well and equally with that of the opposite side. March 17, complete return of function of right arm. March 22, following cessation of digitalis therapy the patient suddenly developed acute heart failure which was rapidly controlled by the further administration of the tincture. April 8, the patient complained of some tingling and sensation of pins and needles in hand and fingers on the right side, but examination revealed no abnormality. From April 11 to May 16 the patient was very noisy, confused, quite irrational and had to be placed in a cot bed and was given luminal gr. 1 t.d.s. This state suddenly cleared up on May 16. From May 16 to July 23 the patient was clinically very well. With digitalis her pulse was stable and between 80 and 90 per minute. Her mental condition was quite normal and she was getting up and walking about the ward without any distress at all. Her blood-pressure was 180/100. The functions of her right hand were all quite normal; in fact, they had been so since the day after the operation and her wound had healed perfectly. On July 23 she complained of a headache coming on suddenly about 2 hours after waking; she became drowsy and then unconscious and a right-sided hemiplegia was noticed. Her condition gradually became worse and she died on July 25.

Post-mortem examination.—Consent for a complete post-mortem examination was withheld by the relatives, but we were permitted to remove the axillary artery. This showed the artery to be patent throughout, and the silk sutures could be seen firmly in situ, in a healed wound 1 cm. long, 1·5 cm. below the origin of the subscapular branch. Microscopic examination of the artery by Dr. A. B. Bratton confirmed the extent of healing: "Foreign-body giant-celled granulation tissue around suture lying in and just internal to media; fibrous interruption of media; fibrous thickening of intima over this, with hypertrophy on either side and slight atheroma."

SUMMARY

Arterial embolism occurring in a patient of 57 years, suffering from mitral stenosis and hypertension, and successfully treated by arterial embolectomy, is reported. Death ensued 4½ months later probably as a result of a cerebral embolism, but not before convincing proof was given of the value of the operation. The soundness of arterial healing was demonstrated at post-mortem.

We wish to acknowledge our thanks to Sir Frederick Menzies, medical officer of health of the London County Council, for his permission to publish this article, and to Dr. C. Thackray, medical superintendent of Highgate Hospital, for his advice.

SHERLOCK HOLMES, RADIOLOGIST

IN the last war a small but thriving trade was carried on (until it was found out) in sputum containing tubercle bacilli to add verisimilitude to an otherwise unconvincing narrative before medical boards. As science advances, so the armamentarium of evil-doers increases, and it is quite on the cards that in this war attempts will be made to foist somebody else's radiogram on the medical examiner. With this possibility in mind Dr. Michele Boffano (*Quad. Radiol.* 1939, n.s. **4**, 111), in emulation of Bertillon's photographic method of identification, has assembled the main points that may be used in the identification of a radiogram of the chest. Another radiogram has to be taken in the same position as the one under suspicion, and the two are then compared. Dr. Boffano marshals the physical details in two categories: (1) anomalies or other peculiarities which stamp a radiogram with, as it were, a sign-manual; and (2) ordinary details which taken as a whole build up a radiological picture peculiar to the individual. "Sign-manuals" include calcified glands anomalous pulmonary lobes (azygos, infracardiac, apicodorsal), anomalies of the diaphragm (hernia, adhesions, elevation due to phrenicectomy, when search may be made for a related scar on the person), foreign bodies (bullets, shrapnel, calcified parasites) in the soft tissues of the thorax, anomalies of the ribs (cervical rib, bifurcation, callus from old fractures) and of the spine (spina bifida, lumbarisation of the twelfth dorsal vertebra), diseases of bone (caries, rickets, arthritis), and signs of surgical operations (resection of ribs, thoracoplasty, extrapleural artificial pneumothorax, oleothorax, plombage). The ordinary physical details common to all chests include size and shape of the thorax and of the heart with the aorta, thickened pleura, and configuration of ribs, clavicles, and vertebræ.

REVIEWS AND NOTICES OF BOOKS

Human Gastric Secretion

By BENGT J. E. IHRE, M.D., lecturer on gastro-enterology at the Caroline Institute, assistant physician to St. Erik's Hospital, Stockholm. London: Humphrey Milford, Oxford University Press. 1939. Pp. 232. 12*s.* 6*d.*

THE inadequacy of our methods for investigating changes in human gastric secretion has long been recognised. Most previous workers have contented themselves with examining the fractions withdrawn after a gruel meal or the secretion elicited by a histamine injection. These methods carry the inevitable disadvantage that the rate of neutralisation and emptying of the stomach contents and duodenal regurgitation all remain variable and no accurate conclusions can be drawn from the figures obtained. In their place Dr. Ihre uses the Lagerlöf-Agren double tube in the stomach and duodenum, employing continuous suction so that the gastric and duodenal juices are quantitatively recovered. As stimulants for gastric secretion he uses histamine and intravenous insulin. The vagal effect produced by insulin hypoglycæmia stimulates the pepsin secreting cells. He employs the accurate method of Wilstatter and Waldschmidt-Leitz for the estimation of pepsin. With these methods he has expanded present theories of normal gastric secretion, and investigated accurately the gastric secretion in a large number of pathological cases.

There have always been two main theories of gastric secretion. Pavlov postulated that hydrochloric acid is secreted at a high constant concentration and variations are produced by neutralisation and dilution; Rosemann, on the other hand, believed that the chloride ion could either be excreted as the sodium salt or as hydrochloric acid, the extent of this variation depending on the stimulus. Dr. Ihre presents excellent evidence in favour of the theory of a high constant primary acidity even in the abnormal stomach. His work shows conclusively that an alkaline mucous secretion is insufficient to account for the drop of acidity observed in the stomach and that this fall takes place without any alteration of the volume of the gastric juice. The most satisfactory explanation is that first developed by Teorell, the back diffusion of H and Cl ions into the blood. This theory renders a hypothetical diluting secretion unnecessary.

The majority of Dr. Ihre's cases showed a lowered acidity, particularly those of gastritis without ulcer, though possessing a normal primary acidity. This he regards as due to increased back diffusion. He never found a higher acidity than normal and it is to be hoped that the meaningless term hyperacidity will now disappear from our vocabulary. Hyperpepsinia he found most commonly in chronic gastric and duodenal ulceration. No physician can afford to neglect this book.

Fundamentals of Biochemistry

In relation to Human Physiology. (6th ed.) By T. R. PARSONS, M.A. Camb., B.Sc. Lond. Cambridge: W. Heffer and Sons. 1939. Pp. 461. 10*s.* 6*d.*

THE teaching of biochemistry to medical students becomes more and more difficult as time goes on, first because of the increased amount of work required for the medical syllabus, and secondly because of the increasing complexity of the subject. And this increasing difficulty also applies to the writing of textbooks. Nevertheless, Mr. Parsons's book, which started in a comparatively modest way in 1923, can truly be said to touch on all the important problems. The work has always been noted for its accuracy, and in this edition the author has tackled all the complex recent advances admirably. The chapters on carbohydrates, the sterols, body-pigments and oxidation reduction in the animal body are masterpieces of clear writing, and can be followed by anyone with a minimum of chemical and mathematical knowledge.

Radiologie clinique du cœur et des gros vaisseaux

By CH. LAUBRY, P. COTTENOT, D. ROUTIER and R. HEIM DE BALSAC. Paris: Masson et Cie. 1939. Pp. 340. Frs.430. (Two volumes.)

THE scope of radiology of the heart has so widened in the past few years that only the expert cardiologist can be expected to keep abreast with its developments. It is now generally recognised that even extensive changes in the heart and great vessels may escape detection by clinical methods. For example, great cardiac enlargement may not be revealed by percussion or palpation; mitral disease may produce a characteristic change in the X-ray silhouette when auscultation is negative; and for the diagnosis of pulmonary-artery and aortic lesions, cardiac aneurysms, and pericardial calcification and effusion, radiology is indispensable. The thousand illustrations in this beautifully produced book make an unsurpassed collection of radiograms, with many diagrams and photographs of anatomical specimens. X-ray studies on the cadaver after the injection of opaque material into the heart are included, and these are correlated with pictures of the living subject. Kymograms supplement the ordinary radiograms in each section. The book is based partly on an ætiological and partly on an anatomical classification, the first volume dealing with the normal heart and rheumatic valve lesions, and the second with congenital lesions, degenerative cardiac and aortic diseases, aortic aneurysm and the pericardium. Brief clinical and in many instances autopsy details are given of the cases to which the illustrations apply, and in each section there is a short but adequate textual discussion. The book is certainly a milestone in the literature of cardiology and a work of art.

Nutrition and Diet in Health and Disease

(3rd ed.) By JAMES S. MCLESTER, M.D., professor of medicine in the University of Alabama, U.S.A. London: W. B. Saunders Company. 1939. Pp. 838. 40*s.*

THIS book is the result of active practice of dietetics in hospital and private work, and therefore appeals more to the practitioner rather than the laboratory worker. None the less, over a third of the book is taken up with the discussion of digestion, metabolism, fuel and protein requirement, the chemistry of vitamins and inorganic elements, the characteristics of food and food products and diet in health. The rest is concerned with nutrition in disease together with nearly 60 pages of appendix covering special methods of feeding, cooking, and tables of height-weight-age and the vitamin and other contents of foods. A special chapter is contributed by Dean Lewis, of Johns Hopkins University, on the feeding of surgical cases and one on the feeding of infants by Dr. P. C. Jeans, of Iowa, both recognised experts. For the English reader considerable translation will at times have to be done and some taboos overcome. Who, for instance,

in this country would have thought of the following sandwich-filling for the midday meal of a school child: cottage cheese, salted and mixed with chow-chow, chili sauce, chopped dill pickle, green pepper, celery, parsley, onion and other salad vegetable, or chopped nuts? And not many practitioners, with the exception of the younger pædiatricians, would adopt the feeding of vegetables and fruits to babies at the age of 5 to 6 months or "even earlier if desired." On the more abnormal side of dietetics the author's outlook is sane and up to date. He is not impressed by the low ascorbic-acid value of the blood of a peptic ulcer patient, and refuses to believe that avitaminosis is the cause of the ulcer, but rather that the hypovitaminosis is the result of faulty diet due to careless prescription. But he is quite prepared to accept the idea that functional disorders of the autonomic nervous system precipitate ulcers. He is not attracted to Meulengracht's diet for the patient immediately after hæmatemesis, but none the less quotes his figures for the mortality among his patients. His pages on constipation should be read by every sister in hospital ward and private nursing-home and also by the Treasury, which reaps a large revenue from purgative patent medicines. He treats many cases of habitual constipation with low residue diets, and indeed, following Alvarez, is inclined to experiment with a low residue diet in almost any type of digestive disorder. One or two grumbles we must allow ourselves. Voit is spelt Voigt on p. 74. In the discussion of vitamins Hopkins's name is entirely omitted. There is no index of names, so that without reading right through the book one cannot discover if Haggard and Greenberg's work on diet and efficiency has been discussed. On p. 436 he seems to have confused mesencephalon with diencephalon. But these are small points. The book is sound and sagacious, free from fads and fancies, and certain of success.

Combined Textbook of Obstetrics and Gynæcology

(3rd ed.) Revised and rewritten by J. M. MUNRO KERR, LL.D., M.D., F.R.F.P.S., F.R.C.O.G., professor emeritus of midwifery in the University of Glasgow; formerly obstetric surgeon to the Glasgow Royal Maternity and Women's Hospital; and eight additional authors. Edinburgh: E. and S. Livingstone. 1939. Pp. 1192. 37*s*. 6*d*.

THIS volume succeeds admirably in combining the two subjects of obstetrics and gynæcology. Although the authorship is multiple it would appear that it is collective with the exception of two chapters, that by Prof. Charles McNeil on the health, nutrition and disorders of the newborn infant and that by Dr. G. Jackson Wilson on radiography, radium and X-ray therapy. Part 1 deals with the anatomy and physiology of the female generative organs, and includes a balanced account of present-day knowledge of the activities and interactivities of the endocrine (sex) glands. The physiology and symptomatology of normal pregnancy are described in part 2, and here more space might well have been given to the aims, possibilities and limitations of prenatal care. Part 3, on the pathology of pregnancy, contains quite one of the best accounts of the association of pregnancy with disturbances of the other maternal systems. In parts 4 and 5 the teaching about normal and abnormal labour is sound, practical and conservative. It is interesting that induction of premature labour is not advised in the management of alleged disproportion in primigravidæ. The section on obstetrics ends with a valuable brief review of the causes and factors influencing puerperal mortality. This is followed by a chapter urging the necessity for a close alliance between obstetrics and gynæcology. The second half of the book is good, but not so attractive as the first. Insufficient attention seems to be drawn to that all-important factor in most pelvic disorders, the psychology of the patient. The various alleged twists, kinks and displacements that are attributed to the uterus seem, on the other hand, to receive undue attention. But the work as a whole, both text and illustrations, deserves unstinted praise.

Office Gynecology

By J. P. GREENHILL, B.S., M.D., F.A.C.S., professor of obstetrics and gynecology, Loyola University Medical School, Chicago. Chicago: Year Book Publishers; London: H. K. Lewis and Co. 1939. Pp. 406. 14*s*. 6*d*.

THIS book is intended for doctors in general practice who want to know what treatment in gynæcology is practicable in the consulting-room. But there must be few consulting-rooms, either in general or specialist practice, that are so equipped that a fraction of the procedures outlined could be performed. Among the chapters of outstanding value is one in which Professor Greenhill explains the practical aspects of that bewildering subject, endocrinology as it pertains to gynæcology. Other excellent chapters are those on dyspareunia, sterility, the control of conception, and the early diagnosis of carcinoma of the cervix. The investigations and treatment advocated for conditions giving rise to vaginal discharge are both sound and practical. Other sections deal with the importance of facilities for "office urology" and the rectal examination. Treatment is set out in detail, with full instruction as to times and methods of administration. It would perhaps be unusual here for the practitioner to attempt such minor operations in the consulting-room as diathermy excision of an infected cervical mucosa, tubal insufflation or the removal of a caruncle, but those who make a study of the diseases of women will certainly find a great deal of valuable help and information in this book.

How Life Began

A Speculative Study in Modern Biology. By DAVID FORSYTH, M.D., D.Sc. Lond., F.R.C.P., consulting physician to Charing Cross Hospital, London. London: William Heinemann (Medical Books). 1939. Pp. 106. 5*s*.

SCIENTIFIC speculation is often entertaining and may stimulate further discovery so long as it is done with due regard to established fact and to the opinions of competent authorities. There is much speculation in this book which can hardly be said to fulfil these conditions. It is, for instance, legitimate to compare the attraction of the gametes with that between positively and negatively charged particles, but to suggest that the same forces may be involved is to ignore both the obvious fact of the specificity of the gametes and the extensive modern work on fertiiisation which gives not the faintest support to such a notion. Dr. Forsyth gives clearer and more serious thought to other problems. He points out the well-known difficulty of drawing a clear-cut distinction between a given organism and its environment. His claim that there is in reality no distinction is based mainly on the fact that an organism at all stages is constantly exchanging substances with the environment, and the molecules which compose it at one moment may later be entirely exchanged for others. Wherein then does the individuality of the organism lie as distinct from the environment? It is here assumed that individuality cannot exist without constancy of chemical composition. There is no biologist who would not subscribe to

the exact converse of this. What is permanent and individual about an organism is not the molecules that compose it, which are always changing, but the organised patterns of reactions in which those molecules take part. An organism could in fact be regarded as a focal point around which these reactions are proceeding. Though the edges may be blurred, we have every reason for regarding as an individual organism this whirlwind of events which are concentrated in a definite region of space. Driven to its logical conclusion, Dr. Forsyth's conception would stifle further biological research, since individual organisms would have no separate existence.

Sulfanilamide, Sulfapyridine and Allied Compounds

Their Clinical and Experimental Use. By PERRIN H. LONG, M.D., associate professor of medicine, the school of medicine, Johns Hopkins University; and ELEANOR A. BLISS, Sc.D., fellow in medicine at the school. London: Macmillan and Co. 1939. Pp. 319. 15*s.* 6*d.*

THE authors of this book have summarised and adjudicated upon all existing knowledge of their subject—all, that is, which existed in February last, when the manuscript apparently went to press. Of the eight chapters, four deal with historical development, chemotherapy in the experimental animal, pharmacology, and mode of action, while the remainder are clinical, dealing with the therapeutic use of sulphanilamide, sulphapyridine and prontosil, and with the toxic effects they produce. Each infection and each manifestation of it is considered separately. The references total nearly a thousand, but in spite of this full documentation the book is tersely written and easily readable. The authors' personal views are vigorously expressed without denying fair expression to those of others. The authors continue to prefer sulphanilamide for most purposes. In their view there is no convincing evidence that sulphapyridine is superior to it in any infections except the pneumococcal. They urge that sulphanilamide treatment should supplant amputation in all but "far advanced" cases of gas gangrene: the rapidity with which gas-bacillus infections are brought under control, they say, is often startling. Unless the discovery of new and better sulphonamide compounds or of unsuspected facts about the present ones puts it out of date, this book will remain a valuable source of information for which anyone practising medicine can find almost daily use.

Handbook of Diseases of Infants and Children

(2nd ed.) By F. M. B. ALLEN, M.D., F.R.C.P., honorary physician to the Hospital for Sick Children and physician in charge of infants to the Royal Maternity Hospital, Belfast. London: Baillière, Tindall and Cox. 1939. Pp. 416. 18*s.*

THERE may be too many textbooks on diseases of children, but few of them suit both the student's purse and his requirements. The cheaper books have erred in making a vast and important subject appear trivial and suitable for "cramming." Dr. Allen's book is excellently balanced; reasonable brevity has been achieved by omitting matter which is readily available in textbooks of general medicine and applied physiology, while few of the features of diseases peculiar to childhood are neglected. In the chapters on the management and feeding of the normal infant the author is content to state the accepted physiological facts and to draw broad conclusions therefrom—a refreshing departure from the pseudoscientific "systems" and riding of hobbies with which this aspect of pædiatrics is too often encumbered. Some valuable modern methods of treatment are underemphasised. Thus, while recognising the value of oxygen therapy in cases of pneumonia, Dr. Allen does not mention the oxygen tent, generally considered the best way of administering it. In pyloric stenosis and pylorospasm many will feel that Eumydrin has a greater value than is ascribed to it here. The complications of sulphanilamide therapy are not even mentioned. To criticise so minutely is, however, to compliment the book as a whole. The illustrations are well chosen and well reproduced, and altogether this is just the textbook that the student wants.

Black's Medical Dictionary

(15th ed.) By J. D. COMRIE, M.D., F.R.C.P.E., physician to the Royal Infirmary, Edinburgh; lecturer on the practice of medicine in the School of the Royal Colleges at Edinburgh; lecturer on history of medicine, University of Edinburgh. London: Adam and Charles Black. 1939. Pp. 1006. 18*s.*

Stedman's Practical Medical Dictionary

(14th ed.) By T. L. STEDMAN, M.D., and S. T. GARBER, M.D. London: Baillière, Tindall and Cox. 1939. Pp. 1304. 37*s.* 6*d.*

THESE dictionaries are very different in aim and scope, and are largely complementary. Stedman's book is more closely akin to the popular notion of a dictionary in that it seeks, with success, to define any term likely to be met with in writings on medicine or its "ancillary sciences," such as chemistry, physics or physiology. Being American in origin, the spelling does not always coincide with general usage in this country. For example, Stedman writes "miosis" where the Englishman may prefer "meiosis"; and banishes the diphthong in such words as hæmorrhage. He is faithful to the orthography adopted by the American Medical Association, but there seems no reason why "hemorrhage" should not be further phonetically simplified to "hemorage," though let us hope that English medical men will continue to waste ink by retaining the forms hallowed by time and derivation. Stedman's virtues as a lexicologist shine conspicuously in this new edition, though he did not live to see it published.

Black's dictionary is of an entirely different type: it is an alphabetical cyclopædia of information on the thousand and one subjects of medical interest both to the doctor and the layman. It would, for instance, make it possible for a layman to appreciate the points at issue in the Croydon typhoid inquiry. A feature of the present edition is the section on the management of air-raid casualties. Dr. Comrie unhappily also did not live to see his revision through the press.

Outline of Physiology

By WILLIAM R. AMBERSON, Ph.D., professor of physiology in the University of Maryland; and DIETRICH C. SMITH, Ph.D., associate professor of physiology in the university. London: Baillière, Tindall and Cox. 1939. Pp. 412. 22*s.*

ALTHOUGH the attitude of a student towards a subject is probably determined largely by the first impression it makes upon him, elementary textbooks tend to conform to a well-known type. Dr. Amberson and Dr. Smith have broken away from tradition and produced a first-rate introduction to physiology. Their book keeps the interest and continually stimulates the enthusiasm of the reader. Every illustration is a work of art, the most up-to-date treatment is combined with well-chosen examples of historical development, and the text is written not only with vision but with accuracy.

THE LANCET

LONDON: SATURDAY, JANUARY 6, 1940

RATIONING

OUR butter, bacon and ham, and sugar are to be rationed on Jan. 8, and meat is to be added to the list some time in February. Of the foods originally down for rationing, only cooking fats and margarines are not included, and it is hoped that it will be unnecessary to add them later. We are to get 4 oz. of butter a week, compared with the 8 oz. allowed by domestic science and the pound asked for by dietitians, and 4 oz. of bacon or ham, compared with the 8 oz. a week allowed to the regular soldier. The sugar ration will be 12 oz. a week, syrup, treacle and jam, and sweets remaining unrationed. We shall have to eat considerably less of all the rationed foods than we are accustomed to, but in no case is the reduction a dietetic tragedy. The reduction in butter will have to be made good by other fats and other sources of vitamin A. Cutting down our bacon and ham entails a smaller intake of vitamin B, but bacon is more a domestic habit than a dietetic necessity. Most people will find the 12 oz. of sugar ample, more especially if they eke it out with saccharin as an enthusiast urges in our correspondence columns, though as a nation we get through about 2 lb. each a week. Nor is the probable restriction in meat serious, so long as unlimited quantities of milk and cheese can still be bought at a reasonable price. We quite understand the need for rationing. The Minister of Food says that in distribution priority must be given to the needs of the Services. The army must be better fed than an equivalent body of civilians in times of peace. This, with the difficulty of transport overseas, reduces the amount of food available for civilians. If things were allowed to rip, the rich would get the food they wanted and the poor would be sent empty away—a potent source of disaffection. With rationing everyone will get a fair share, if not a bountiful one. Thus modern civilisation will organise the production and distribution of food in war-time to aid in destruction, though it would not do the same in peace for social welfare.

On the whole the plans for rationing are reasonable. It is a pity that sugar had to be limited, for it is a convenient, rapid and cheap source of energy. It is more regrettable that the Ministry of Food has not kept to its original plan of making the supply of any but vitaminised margarines illegal. There seems to be no excuse for omitting this simple precaution. All the margarines sold by the Co-operative Wholesale Society, for instance, are vitaminised. Until compulsion is applied the public should refuse to purchase unvitaminised margarines and so help to drive them off the market. Otherwise there may be deficiency among those who do not get enough vitamins from other sources. Even the well-to-do sometimes lack vitamin A in their diet; such lack leads to night-blindness, xerophthalmia and keratomalacia, as was seen in the last war and already in Germany today. Potent sources of vitamin A, other than butter and vitaminised margarine, are liver (the highest among ordinary foodstuffs), tomatoes, sardines, carrots and spinach—roughly in that order. To be on the safe side, more especially in blackout conditions, some say we should all take a teaspoonful of cod-liver oil or its equivalent in halibut-liver oil every day during (and after) the war.

The rationing of meat is to go by quality rather than quantity. A person who buys fillet steak will get less than one who buys topside or clod, so that the less well-to-do may actually get more protein for their coupon than the wealthy or the gourmet. This is as it should be. But people will need to learn which joint to buy in order to obtain the most protein for the least outlay in cost of purchase and cooking. Thus cuts such as shin of beef which are stewed may cost more per unit of protein than one that can be cooked by some more rapid and cheaper process. The "edible offals"—tripe, liver, kidneys, heart, tongue, sweetbreads and oxtail—like rabbits, fish, game and poultry will not be rationed. Those who can afford and are used to three meat meals a day may well make offal the *pièce de résistance* of one of these meals. Rationing may also stimulate the consumption of that agricultural nuisance, the rabbit. The poor will be glad to hear that chaps, chowls, knuckles, forelegs and "picnics" of bacon are unrationed. These are cheap, quite palatable, and, since they contain a large amount of vitamin B_1, relieve us from the fear of deficiency of that vitamin, so assiduously sown by patent food and medicine advertisements. To the dietitian the question of which meat to choose is merely academic: his advice would be to turn right over from meat to milk and cheese, especially if he could be sure that prices would remain at their present level. The poet had the right idea when he wrote:

> **A cook of the College of Caius**
> **Paid the butcher exorbitant faius**
> **And such a deceit**
> **They suffered in meit**
> **They'd better have fed upon chaius**

Judged as an economical machine for converting plant food into protein, the cow heads the list by turning it into milk; next comes the sheep; then the pig; and finally the store bullock. Nothing but custom makes us prefer meat to milk as a source of protein, and at present prices our money gives a far better return in food value if it is spent on cheese and milk than if it is spent on meat. If only everyone realised this fact and acted upon it they would be "joining in the good work being done by the Navy and the mercantile marine," as Mr. MORRISON puts it, and would be doing their health and pocket a bit of good as well.

THE MIND OF HITLER

A PSYCHIATRIST has tried in this issue to characterise the morbid features of our representative enemy in this war, the human symbol of our particular Satan. The attempt cannot be successful because we do not know enough about either HITLER himself or the type of anomaly he seems to exhibit. But there is some piquancy in taking so striking an example of German psychiatry as KRAEPELIN'S description and fitting it on to this German bulk, self-described in "Mein Kampf" and in more recent deliverances. Whether HITLER is regarded as wholly hysteric or not, the most suitable general category in which to place him would undoubtedly be one for which we are indebted partly to an Englishman, PRITCHARD, who described the state of "moral insanity" in 1835 and partly to a German, KOCH, who in 1888 gave this state its epithet "psychopathic." The subject has lately been elucidated by Prof. D. K. HENDERSON.[1] "The term psychopathic state," he writes, "is the name we apply to those individuals who conform to a certain intellectual standard, sometimes high, sometimes approaching the realm of defect but yet not amounting to it, who throughout their lives or from a comparatively early age have exhibited disorders of conduct of an antisocial or asocial nature, usually of a recurrent or episodic type, which in many instances have proved difficult to influence by means of social, penal and medical care and treatment and for whom we have no adequate provision of a preventive or curative nature." Elsewhere he remarks that "we have people in our midst, semi-insane or semi-responsible, if you like to use such terms, who in every walk of life from the highest social and political offices to the ranks of the unemployed and delinquent not only are unable to conform adequately in their personal lives, but may even be responsible for some of the greatest social crimes in history."

This statement covers the problem that KOCH and our contributor have recognised. KOCH, for example, pointed with emphatic surprise at the contrasts in the character of ROBESPIERRE, which had not prevented him from expressing on revolutionary France his psychopathic drives and abilities. BUMKE,[2] professor of psychiatry in Münich, has stressed that there is a group of psychopaths of whom this is particularly true. He calls them cold or unfeeling (gemütlose) psychopaths—the name given also by SCHNEIDER to the cruel, violent, apparently conscienceless, ruthless people whom KRAEPELIN puts in the category of "enemies of society." BUMKE says of this group that they "pursue their aims without regard to the feelings of others and therefore almost always attain them. . . . Among them are misers, tyrants of the home or the office, brutal business men, as well as leaders (einzelne Führer) in political and social life. . . . Nowadays (1929) one no longer needs to emphasise how great a rôle fanatics and other psychopaths play in history and especially in the history of revolution." Thus presciently did BUMKE write, looking at history and at the Germany of a decade ago.

It may seem that to include HITLER among the "gemütlose" psychopaths is to question a diagnosis which puts him in another group, the hysterical psychopaths. But all—KOCH, KRAEPELIN, SCHNEIDER, KAHN, HENDERSON and the rest—who have written about psychopathic states have insisted on the inadequacy of the various categories of psychopathy, if one wishes to fit a particular psychopath completely into one of them: there were always mixtures and apparent contradictions. Apart from the traits which seem to place him in the hysterical and unfeeling categories of psychopathy, HITLER shows features too of what the German writers describe as "fanatical psychopathy." The fanatics are of two kinds, the martyrs, who tend to yield, and the "rigid aggressive misanthropical fanatics of the resentful type who in the prosecution of their convictions are always running up against opposition and then try to force their way through blindly and are ready to use violence. It is because of their joy in the struggle (Kampf) that these fanatics become tiresome and occasionally dangerous. . . . Even behind their most tenacious and aggressive struggles about seemingly general ideals lurk touchiness and a sense of personal defeat." It is of this group that LANGE[3] wrote three years ago. "The more pronounced their resentful disposition, the more trifling can the injury be which upsets them. . . . They develop the unshakable conviction that they are in the right. They have not the ability to see the rights of others and to understand that regulations are necessary for the sake of the community." Such psychopaths usually play their part upon a smaller stage than HITLER'S: the law-courts are their common scene. They find that everyone who does not support their cause is perjured or corrupt, they show such skill and plausibility in asserting their probity and in manipulating the evidence that, as LANGE says, they manage "to convince other people who are not quite capable of forming a sound judgment of the matter." It is this aspect of psychopathy which has led some psychiatrists to describe HITLER as paranoid; but as our contributor points out, he has probably not become deluded, and the term is hardly apposite. Correct labelling, however, is the beginning, not the end, of psychiatric wisdom. Whether HITLER is regarded as an example of mainly hysterical, or fanatical, or schizoid unfeeling psychopathy, the real problems lie behind his individual personality and are concerned with the disease of which he is a prominent and ugly symptom.

1. Psychopathic States. London: Chapman and Hall. 1939.
2. Bumke, O., Lehrbuch der Geisteskrankheiten. Berlin. 1929. 3rd ed.
3. Lange, J., Kurzgefasstes Lehrbuch der Psychiatrie. Leipzig. 1936. 2nd ed.

HEALTH IN ENGLISH PRISONS

THE Prison Commissioners' report for 1938, just published,[1] shows that health in our prisons is good. Hospital facilities are being steadily improved, but the hospital population is falling. The earnings system, it is said, has changed the prisoner's attitude to hospital treatment. While in hospital he cannot earn. It is now often necessary to order him into hospital; former experience was very different. Medical officers indeed have now to be increasingly vigilant lest his anxiety to avoid going sick should injure his health. The surgical unit at Wormwood Scrubs continues to justify itself. In the same prison Dr. W. H. de B. Hubert is to carry on his psychological treatment in suitable cases. Authority has been obtained for engaging a woman medical psychotherapist for like work at Holloway among women and girl offenders. When Dr. Hubert and Dr. Norwood East published last spring their joint report on "The Psychological Treatment of Crime," the results of a four-year plan of experimental work in this field became available. Dr. J. C. W. Methven, the new medical commissioner, is plainly anxious to see the fulfilment of one of the recommendations in that report. The authors considered that, provided that the cases were carefully selected, psychotherapy could help to prevent or reduce the chance of future anti-social behaviour. They recommended the creation of a special institution for the care, study and treatment of a selected group of criminals. Such a place, they said, would have a fourfold function. It would be a clinic hospital for investigation and treatment, an environment where selected cases could live under special conditions of training, a colony for the type of offender who has resisted all efforts to train him, and an observation and treatment centre for Borstal lads found mentally abnormal. The war is likely to restrict any expenditure of this kind. Yet the strong element of mental instability in those whose conduct brings them into our criminal courts is a form of national extravagance about which we cannot be complacent. In 1938 no fewer than 97 inmates of local prisons were certified insane, 309 persons were found insane by medical officers when examined on remand, juries found 26 persons insane on arraignment and 22 earned the verdict of "guilty but insane." Apparently there is still an imperfect contact between those who administer justice and the medical officer who could help them. Courts do not always ask for medical reports *before* sentencing a prisoner, nor do they send to the medical examiner the full information they possess about the offender.

The administrative treatment of the prisoner causes notorious differences of opinion. Some, Dr. Methven remarks, think prisons are too soft, punishment is neglected, discipline is too mild and flogging too rare. Others say that prisons should be sanatoria, that offenders should be surrounded with love and charity, that what they require is treatment, and only treatment on up-to-date psychological lines. The medical commissioner observes that it is not possible that both schools of thought can be right. "It is practically certain that both are wrong; somewhere between these two extremes lies the truth." Every man and woman who comes to prison is a problem of individual investigation. The public, by the way, could help to end one scandal which the prison commissioners refer to when describing the efforts made to aid men on their discharge. "It is against public decency to stand outside prison gates in order that a photograph may be taken of a prisoner on the morning of discharge, however notorious may have been the case in which the person was concerned; it is not less indecent to continue to track the discharged prisoner down and issue a press report on where he is going to live." Obituary notices likewise, such as those where headlines lately announced that a "titled ex-convict" was dead, are objectionable; they take little account of the feelings of relatives. When a prisoner has served his sentence, say the commissioners, surely he has purged his offence. Why make it a life sentence?

1. Cmd. 6137: H.M. Stationery Office. 2s.

STUDENTS AND THE E.M.S.

THE Minister of Health has decided as from Jan. 1 to stop paying for the board and lodging of those students who have been attached to hospitals as dressers and the like in the Emergency Medical Service. In a circular issued on Dec. 29 he states that in the present circumstances he is not justified in regarding the assistance of medical students as necessary to the scheme. He will still, however, continue the present arrangements by which students attached for teaching purposes to sector hospitals are billeted by the local authority's billeting officer. But such hospital students will now have to repay the cost of their accommodation—namely, 5*s*. a week for lodging only or £1 1*s*. a week for board and lodging. Later on, if students are needed to assist with the treatment of casualties, their board and lodging may again be paid for by the Ministry.

This change will no doubt encourage the return of clinical students to London. We understand that in the case of the Middlesex Hospital, for instance, the majority of students who have been attached to outlying hospitals are returning to London within the next fortnight. At St. Thomas's, too, only those students will stay out of London who have been appointed as dressers elsewhere in the sector for a definite period of three months. The preclinical schools of these two hospitals are also returning to London this term. The cost of maintaining a preclinical school at Oxford for St. Thomas's students has apparently proved prohibitive. The teaching of clinical subjects in the sector hospitals has sometimes been highly satisfactory. This has been so especially where students have been living in close contact with the surgeons and physicians who taught them in London. Now that so many of these have gone on half-time and returned to

London much of this advantage is lost. On the whole the opinion seems now to be that the education of most students of the London schools will suffer if it is continued in the country. How far the return movement will become general must depend on the number of beds available in the London hospitals for teaching purposes. At the London Hospital, for instance, there are still only some 230 inpatients compared with the normal 891, and these would not be sufficient clinical material for a full complement of students.

The suggestion in the Ministry's circular that students may again be called for if required raises the question whether during their clinical period students should not be definitely enrolled as part of the E.M.S. So far there has been no such enrolment and the services provided by students have been on a voluntary basis. The replacement of students in the sector hospitals if they are needed to help with air-raid casualties will clearly be simplified if a students' section of the E.M.S. is formed now, its members undertaking, when called upon, to do specified duties at specified hospitals.

ANNOTATIONS

GOINGS-ON IN THE UNITED STATES

DURING the last few years echoes have reached this country of stirrings among the profession and the public in the United States about the extension of medical services. We have heard rumours of the work of the Committee of Physicians, and we have read in the letters of our American correspondents and elsewhere of the indictment by a federal grand jury of the American Medical Association under the laws against restraint-of-trade, which for months was front page news in the United States, of the National Health Conference, and more recently, of Senator Wagner's national health bill. Now Mr. John A. Kingsbury [1] has summarised, not without bias, the moves to extend medical care. The organisation of American medicine lags years behind the systems in our own and other European countries. President Roosevelt summed up the situation in two sentences: "Nothing is more important to a nation than the health of its people. . . . But when we see what we know how to do, yet have not done, it is clear that there is need for a coördinated national programme of action." In 1932 the report of the committee on the costs of medical care, which surveyed national medical needs and the available facilities for satisfying them, disclosed the unsatisfactory medical situation of a considerable proportion of the population. In 1935, after the passage of the Social Security Act, the President appointed the interdepartmental committee to coördinate health and welfare activities, which, with the technical committee on medical care, produced in February 1938 a national health programme, making five recommendations. The first proposal included expansion of the public health services, maternal and child health services, and services for crippled children. The second recommended better utilisation and expansion of hospital facilities. The third suggested a programme for medical care for the medically needy. A general programme of medical care somewhat on the lines of our own N.H.I. was the fourth recommendation. (It is interesting to notice that, at the time when the B.M.A. is proposing the extension of N.H.I. to dependants, the American Medical Association is bitterly opposed to the introduction of compulsory health insurance which, it seems, it regards as redolent of "socialism, communism and incitement to revolution"). The fifth provision is for the introduction of insurance against loss of wages during illness. The next event was the National Health Conference held in July 1938, called at the suggestion of the President, where all the important groups and forces concerned with the life and health of the people met to discuss this programme. The "consumers" (the public) and the "producers" (the profession) were represented. There were spokesmen for farmers, parents and teachers, the insurance companies, labour, religious and other charities, and for all branches of the medical and allied professions. The conference agreed in principle, with reservations with the A.M.A. In January, 1939, the President sent a special message to Congress, recommending its consideration of the interdepartmental committee's report, and five days later Senator Wagner of New York introduced a national health bill, less interestingly known as S. 1620. The bill is in essence a working-out of the recommendations of the interdepartmental committee, with particular reference to finance. It envisages the close coöperation of the federal government with the individual state governments in carrying out the provisions of the bill, and in view of the old-standing jealousy of the states against any undue interference by the federal governments it allows considerable latitude in the methods adopted by individual states. Its financial provisions suggest proportional grants from the federal government ranging from 66⅔ per cent. to 33⅓ per cent. according to the relative poverty or wealth of the state concerned, a principle which is essentially just. After the introduction of the bill, public hearings were arranged to give the public and the profession yet another opportunity to express their views. These hearings revealed a change of opinion on the part of the A.M.A., who, having agreed in principle with the original proposals, now opposed the bill which embodied them. The Committee of Physicians, on the other hand, warmly supported the bill. The bill is now in the hands of a senatorial subcommittee who have endorsed its purposes and are considering carefully the legislation involved. They will submit their definitive report for the next session of Congress. There the matter rests, but it seems probable that the bill will shortly become law, without any substantial modifications.

1. Health in Handcuffs. New York: Modern Age Books. 1939. Pp. 210. 75 cents.

THE ACUTE ABDOMEN IN CHILDREN

IT is not only parents who find difficulty in telling a trivial tummy-ache from an acute abdomen in a child, and it is regrettable but not surprising that Miss Gertrude Herzfeld [1] has found at the Royal Edinburgh Hospital for Sick Children that the average duration of illness before admission in appendicitis is 2–3 days. Many helpful hints are contained in her survey of experiences at the hospital over the past ten years. During this time acute abdominal conditions have accounted for 16 per cent. of the total admissions, and of the 753 abdominal lesions 90 per cent. were appendicitis, intussusception, abdominal tuberculosis or peritonitis. The most striking point about appendicitis in early childhood is, she says, its rapid progress. In part this is due to the common

1. *Edin. med. J.* December, 1939, p. 750.

parental habit of giving every child with a "digestive upset" an aperient. In 100 consecutive cases of appendicitis an aperient had been given in 34, and of these 27 required drainage. Only 23 per cent. were found at operation to have the appendix in the classical position. In the majority the organ was retrocæcal, in the pelvis or "high." There were only 12 deaths out of 498 cases of appendicitis, half of these in children under the age of three. In intussusception early diagnosis is also of paramount importance, and it is a revealing fact that although there were 15 deaths out of 107 cases 12 of these were in the first half of the ten-year period under review and only 3 since 1934. Miss Herzfeld attributes this to the comparatively recent addition of the study of children's diseases to the compulsory medical curriculum. The figures of acute abdominal tuberculosis show no improvement in the period, so Scotland still apparently maintains its unfortunate record as regards bovine tuberculous infection. It is perhaps fair to point out, however, that the medical wards appear to have been admitting a decreasing number of more chronic cases of abdominal tuberculosis. Over half of the children with acute abdominal tuberculosis were operated upon with a diagnosis of acute appendicitis. These children proved to have active tuberculosis of the ileocæcal glands. It was usual to remove the appendix, and the subsequent history of these children was satisfactory. Less satisfactory results were obtained when the acute abdominal condition consisted of obstruction or of peritonitis with abscess formation of tuberculous origin. Miss Herzfeld's figures for primary peritonitis—21 deaths out of 32 cases—will almost certainly be improved in future by chemotherapy, particularly in the difficult type of pneumococcal peritonitis affecting girls between five and seven years. In conclusion Miss Herzfeld pays a tribute to the value of the intravenous drip administration of fluid both before and after operation.

PROGNOSIS IN RETINAL DETACHMENT

IN an admirable investigation[1] Seymour Philps reports that at the Royal Westminster Ophthalmic Hospital between 1933 and 1938 the proportion of cures after operation for retinal detachment was 40·8 per cent. He rather naively adds that a further 8 patients were permanently cured in all probability, "for they would almost certainly have come back had the eye become worse again." Alas, our failures too often do no more about it or transfer to another hospital. The bare figure 40·8 per cent. may give an erroneous impression. The prospects of a successful result are considerably greater in a young emmetrope who has sustained a recent traumatic retinal detachment which is located in the periphery of the lower temporal quadrant of one eye and has a single retinal tear, the remaining ocular tissues being healthy and the patient's general health being good. Such a patient, in the hands of an experienced operator, might be justifiably promised an 80–90 per cent. chance of success. Whereas the prospects, although not always hopeless, are considerably less for a high myope with an extensive retinal detachment of long standing, with multiple tears and a degenerate retina, choroid and vitreous. In assessing the prognosis one must consider the site, shape, size and number of the retinal tears, the nature of the adjacent retina, the state of the choroid, vitreous, intraocular pressure, and the duration and extent of the retinal detachment, as well as the age and constitutional health of a patient, the state of his vascular system and blood-pressure, and the presence of focal sepsis. The thoroughness with which a preliminary examination is carried out by the operator is an important factor in the chances of success. It is essential to draw a careful map of the fundus, tracing every blood-vessel over the area of detachment and noting the exact site and meridian of the retinal tears and their relation to the vessels and the assessed distance from the ora serrata. Zones of degeneration, fibrosis, cysts, balloon-like areas of detachment, hæmorrhages and any lesions in the vitreous and choroid should be sketched on the plan. Before the operation begins the surgeon should have before him this plan and should have in his mind a thorough picture of the patient's fundus and its landmarks. It is an essential part of the operation to check by ophthalmoscopic examination the reaction of the choroid to every application of the diathermy electrode placed on the sclera around the edge of the retinal tear or tears.

Variations in operative technique naturally affect the prognosis, as do the postoperative behaviour of the patient and such complications as vitreous hæmorrhage and excessive reaction to the diathermy. The majority of ophthalmic surgeons would agree with de Souza[2] that the standard for a "cure" of retinal detachment should be based on ophthalmoscopic evidence of complete reposition of the retina, and that the visual acuity and visual field improvements are secondary to this.

1. Philps, A. S., *Practitioner*, 1939, **143**, 637.

LAUGHTER AND TEARS

MAN is peculiar among animals in the way he expresses joy or sorrow, and to a varying degree the normal man can keep the expression of his emotions under control. Loss of this control is seen in many psychotic patients, but in these the emotional expression is only abnormal in degree, it still follows their thoughts correctly. In people with multiple and bilateral cerebral lesions, on the other hand, uncontrolled excesses of laughter or crying may be unassociated with any corresponding change in mood. The clinical neurologist associates such outbursts particularly with cerebrovascular disease and with disseminated sclerosis, but the pathologist, because of the multiplicity of the lesions usually found at autopsy, has great difficulty in correlating them with damage to any specific structure. There is nothing inherently psychotic in this phenomenon, although the causal lesions may ultimately bring progressive dementia. The expression of emotion by facial movement, gesture, speech, laughter, or crying is the result of a complex interaction between cortical, thalamic, hypothalamic, extrapyramidal, mesencephalic, and medullary centres, and as it can be studied accurately only in man the scope for experimental investigation is limited. Davison and Kelman[3] have observed 53 patients who showed pathological laughing and crying, and later had the opportunity of examining 33 of them at autopsy. Of the total, 26 had vascular lesions, and 6 disseminated sclerosis, so that the interpretation of the pathological data was difficult and often uncertain. In 31 the lesions involved the cortex, and in 15 they were mainly confined to the basal structures. Their review suggests that the greater part of the cerebral cortex including the hippocampus is used to integrate the expression of mood, and their observations are in line with those of earlier workers in pointing to a release of lower uninhibited mechanisms when cortical pathways are destroyed. Bard[4] showed that "sham rage" occurred

2. de Souza, A. B., *Presse méd.* 1939, **87**, 1537.
3. Davison, C., and Kelman, H., *Arch. Neurol. Psychiat.* October, 1939, **42**, 595.
4. Bard, P., *Amer. J. Physiol.* 1928, **84**, 490.

after section of cortico-hypothalamic pathways in animals, and he thinks that the complete expression of the affective responses depends upon an intact hypothalamus, all strong emotions being the result of a cortical release of lower structures, but although the caudal hypothalamus seems indispensable to emotional expression, other centres are also of great importance. Indeed some maintain that the hypothalamus may merely control a wide area of cortex and basal grey matter which is all brought into play during emotional expression. When the complexity of the psychological processes resulting in changes in mood is considered, it is not surprising that the structures used in expressing these changes should be widespread and intricately interconnected. In fact, the recent investigations confirm that the anatomy of melancholy and of joy is hidden in its own complexity.

MOBILE UNITS FOR ELECTRICAL TREATMENT

DURING the last war the importance of physical therapy in assisting the return of function and hastening convalescence resulted in the development of many large departments fully equipped for electrical treatment and medical gymnastics. A mobile unit on the same lines might bring the most important forms of electrotherapy to the patient's bedside. Such a unit is described in a booklet by Dr. C. B. Heald, physician in charge of the physical medicine department at the Royal Free Hospital, stressing its importance under war conditions. The unit consists of a portable short-wave outfit with inductotherm attachment; two direct-current units; two "Rotosurge" machines—i.e., improved Bristow coils; an ultra-violet light apparatus; an infra-red lamp; a radiant heat lamp; a hot-air douche; and a paraffin wax outfit. The direct-current unit can be used for ionisation. The most important items are the short-wave diathermy outfit and the modified Bristow coil for exercising immobilised muscles. Pain is a serious problem in dealing with the severely wounded. Even with up-to-date methods for immediate treatment, chronic sepsis with all the suffering it entails is bound to be common. Diathermy may therefore well find employment in wards where casualties are treated. The Bristow coil in skilful hands is the ideal method of exercising weakened muscles. It can easily be made available since the coil is run off dry batteries, but the automatic method of "surging" will help the masseur who has a large number of patients to treat. The mobile unit cannot, of course, replace a fully equipped department, for it deals only with passive treatment. In the rehabilitation of the injured, training by active voluntary movements followed by occupational therapy is even more important. Nevertheless, the first of a number of these units, which are being paid for by an anonymous donor, has already been in use in sector 3 for treating casualties from France, and has proved its value in practice.

LONDON CORONERS

LAST month Mr. Samuel Ingleby Oddie retired from the coronership for Central London, having reached the retiring age of seventy. He had long been one of London's leading public figures. Mr. Oddie had a varied career before he finally found the life which suited him. He first intended to become a civil servant, but failing to master the higher mathematics he studied medicine at Edinburgh and qualified there in 1891. He joined the Naval medical service and served afloat for a few years in three of H.M. ships. The Admiralty then desired to send him to China, but he preferred to get married, and set up in general practice as a junior partner at New Malden. The night-work did not appeal to him and he decided to read for the bar, being called by the Middle Temple in 1901. He joined the chambers of Mr. Richard Muir (as he then was), and practised energetically at the criminal bar; in the case of Rex *v.* Crippen (1910) he appeared as junior counsel to the Crown. He became associated with Dr. Danford Thomas, then coroner for the Central London district, and was for a time deputy for West London. When a vacancy occurred he was up against Sir Walter Schroeder but soon after succeeded Dr. Henry Troutbeck at Westminster and South-west London. This was the last appointment of a coroner by the Franchise of Westminster, for the gift of the Westminster coronership was transferred from the dean and chapter of the Abbey to the London County Council by the Coroners Act of 1926. When he went to Central London in 1930 Mr. Oddie still retained the coronership of Westminster.

The vacancy left by Mr. Oddie's retirement has been filled by the appointment of Mr. W. R. H. Heddy, who also has the double qualification: he has been on the medical register since 1914 and was called to the bar by Gray's Inn in 1925. Only son of Dr. W. J. Heddy, who practised in Redcliffe Gardens, he was educated at Dover College and studied medicine at the Middlesex. After four years' service with the R.A.M.C. he joined the staff of the Middlesex public-health department, and in 1934 became assistant deputy coroner to Dr. Danford Thomas. He was later appointed deputy coroner for Central, Northern and Western London, and has now become coroner for the Eastern district.

INTERNATIONAL CONTROL OF DRUGS OF ADDICTION

THE minutes of the 24th session of the advisory committee on traffic in opium and other dangerous drugs, recently published, provide much miscellaneous information. The situation in the Far East continues to occasion grave apprehension. According to the Chinese representative, Dr. Hoo Chi-tsai, the cultivation of the opium-poppy, under the six-year plan is due to terminate in 1940 so far as the area under the Chinese government is concerned. The opium crop is being replaced by cotton, cereals, tea, tobacco, sugar-cane and the like. Active measures are being employed for the "disintoxication" of opium addicts and for their physical culture and moral rehabilitation in workshops. On the other hand it was alleged at the session that in the territory occupied by the Japanese government the cultivation of opium is encouraged, opium-smoking dens and clandestine drug-factories are tolerated and inadequate penalties are imposed for breaches of such regulations as exist for the restriction of the traffic. The United States representative (Mr. Fuller) referred to the great increase in drug addiction during the past year and the enormous quantities of Iranian opium imported into the Japanese-controlled areas of China. He urged that the Japanese Government should restrain the importation of opium and the manufacture of its derivatives in the occupied areas, and that the Iranian authorities should suppress the illicit traffic to the Far East, which appears to be increasing. A further suggestion was that the Portuguese government should prevent their colony of Macao from being used as a base for illicit traffic. The chairman of the committee, Major Coles (United Kingdom) spoke of the situation in the Far East as of "the utmost gravity and a source of extreme anxiety to other countries"; and he observed that the most important of the ques-

tions under consideration was "the work in connexion with the future convention for the limitation of the production of raw materials." A draft of the principal articles to be embodied in the convention was considered in private session, of which no minutes were published. So this fundamental question has been again adjourned, though it is stated that "substantial progress has been made."

HOUSE-APPOINTMENTS

A FEW weeks ago a newly qualified man described in our correspondence columns the plight of those who, having registered with the B.M.A. for war service, were compelled when war broke out to hold themselves in readiness to be called up at some unspecified future date. The obvious way for a young doctor to fill this period of waiting is to take a house-appointment, but the applicants for the available jobs much exceed the supply and the chances of the average man getting one are small. A further obstacle is now being placed by certain hospitals in the way of those waiting their call to the services. For example, in their advertisement in our last issue for a house-surgeon one hospital inserted the clause: "Preference will be given to candidates without military commitments." The hospital committee's point of view is that their primary duty is to ensure having an adequate staff when emergency arises, and hence they do not want to take on a man who may be called away at short notice at any time. While taking it for granted that every possible applicant would have volunteered for service of some kind, they hoped to find one in the category "for home service only." But the clause as it stands is undoubtedly directed against those who have acted with the highest patriotic motives, and seems clearly to be contrary to national interest. We are glad to learn that this particular clause has now been withdrawn. Let us hope that hospital committees will make up their minds that the possibility of frequent changes of house-officers is one of the extra burdens that they have to face in war-time. Although it may be too much to ask that they should give preference to potential members of the fighting services, they should at least consider their claims without prejudice.

RED-CELL SIZE IN INDIA

ACCURATE red-cell measurements have been made both in Europe and America, but little knowledge has hitherto been available about cell size in India. Dr. H. N. Chatterjee[1] has now reviewed the relative value of different methods of estimating cell size and has applied these methods to both normal and pathological bloods of residents in Bengal. He has interested himself particularly in the question of red-cell thickness. His investigation of the anæmias associated with pregnancy has shown that the increased cell volume in the macrocytic type of anæmia has been closely associated with a cell thickness greater than normal. On the other hand, the increase in cell diameter has been less constant in these cases and has not been present in all cases of increased cell volume. The finding of this increased cell thickness is not surprising in view of the evidence brought forward by Evans and Wills[2] that pregnancy may result in increased red-cell fragility. Cassels,[3] who also studied red-cell changes in pregnancy in England, while noting the increased fragility, was unable to correlate this change with any increase in red-cell thickness. This observation that changes in red-cell fragility are associated with pregnancy is of considerable interest, and no explanation has yet been put forward.

1. Studies in the Dimensions of Erythrocytes of Man. By H. N. Chatterjee, M.B., University of Calcutta, 1939. Pp. 36.
2. Evans, B. D. F., and Wills, L., *J. Path. Bact.* 1939, **48**, 437.
3. Cassels, D. A. K., *Ibid*, **47**, 603.

POISON GASES AND FOOD

THE repeated allegations made by the Germans that other countries are using mustard gas, and their latest ridiculous suggestion that we are adding a dash of mustard to our naval shells may possibly be preparing the way for gas-attacks on Britain itself. The civilian population is now fairly well protected and except in crowded areas the menace does not seem formidable so far as direct injury to the person is concerned. Gas might, however, seriously contaminate our food and water supplies.[1] Food in porous containers—sacks or paper or cardboard wrappings—may merely absorb or adsorb a poisonous vapour, without itself undergoing any alteration, but when it is removed to uncontaminated air the vapour may be given off in the air of the store or larder. The cooking of contaminated food is likely to lead to rapid emission of vapour, though heat will also accelerate hydrolysis into harmless but possibly evil-tasting products. What is left unchanged in the food may still lead to digestive disturbances, for it may behave in the stomach much as it does when absorbed by the skin. The risk is of course greater in the case of food like butter and margarine, in which mustard gas is readily soluble, and which are eaten uncooked. The more persistent lacrimatory gases may also be absorbed by foods in the cold and given off on airing or cooking. Lewisite (chlorovinyl dichlorarsine) and other arsines may interact with the water in foodstuffs, leading to the formation of arsenious acid; and organic cyanides may yield hydrocyanic acid. Phosgene easily hydrolyses, producing hydrochloric acid which will not be appreciated in food or drink by any but the confirmed achlorhydric. Tea and tobacco are drastically affected by this gas, as is the baking quality of flour. Airing or rejecting the outer layer of packages of food which have been exposed to gas may allow the rest to be used safely if it is carefully tested, but the safest plan is to use trustworthy containers only. Metal canisters or well-stoppered bottles and jars are the best, and Cellophane is practically gas-proof, but ordinary grease-proof paper and waxed containers cannot be relied on. When food has been contaminated by liquid mustard or other persistent gases the only sound advice seems to be to destroy it.

Dr. J. MIDDLETON MARTIN, who died at Cheltenham on Dec. 30, was formerly county M.O.H. for Gloucester and then conceived one of the first practical schemes for the extension of medical services.

1. See Cox, H. E., *Analyst*, 1939, **64**, 807, and Schoop, F., *J. Pharm. Belg.* 1939, **21**, 793.

GENERAL MEDICAL COUNCIL.—At a meeting of the executive committee of the council held on Nov. 27 it was reported that the following names had been restored to the register after removal (under section 14 of the Medical Act 1858) on failing to keep the council in touch with their whereabouts:

Vincent E. N. Allen, Hugh G. Bruce, Alexander C. Farquharson, Neville C. Gwynn, Gerald B. Kirkland, Noel E. Laurence, Samuel R. Mackenzie, Thomas H. K. MacLaughlin, Henry O. Martin, Alexander Milne-Thomson, David Morrison, Constance A. Mortlock-Brown, Arthur J. de Lyse O'Connor, Edgar F. J. Peregrine, Walter A. Propert, Shaikh A. H. Qureshi, William Reikan, Charles E. Rice and Chung Ching Wang.

CONTROL OF THE COMMON FEVERS

CEREBROSPINAL FEVER

Reviewed by Dr. H. STANLEY BANKS, *Medical Superintendent of the Park Hospital (London County Council), Hither Green*

LATE winter and spring are the season of meningococcal disease in Europe. Sudden changes of weather—typically a fall in temperature or else a rise in humidity—appear to start the upward trend of the disease, the maximal effect being apparent a month or so later. Exceptionally, as in the Sudan, the change to dry dusty weather is associated with the disease. A common factor in these changes is widespread nasopharyngeal catarrh. Seasonal prevalence reaches a maximum in February or March, with sufficient impetus to carry it with gradually diminishing force to May and June. Prevalence is greatest among the younger age-groups, children under ten being the most susceptible in a mixed population. Next come the adolescents and young adults. Young recruits in barracks and camps have always been conspicuous among those affected. Among people aged forty or more the disease is relatively uncommon and has been highly fatal. Males are more susceptible than females, the ratio in some epidemics being as high as 2 to 1. Differences in occupation and other environmental factors leading to more frequent exposure to infection have been suggested to explain the greater incidence in males.

CASE-MORTALITY

The case-mortality has shown a high correlation with certain age-groups. Among children under one year it has, even in serum-treated cases, often reached 65–95 per cent., and in patients over forty 60–80 per cent. In 2618 serum-treated cases in hospitals in England and Wales 1931–36 Sturdee (1936) has shown the most favourable age-group to be five to twenty years, with a case-mortality of 24·6 per cent. The case-mortality for all ages in this series was 37 per cent., whereas in 362 cases not treated with serum the case-mortality at all ages was 60–70 per cent. (Sturdee 1938). In 1914–18 there were 4258 cases, with 1892 deaths, among troops in the United Kingdom, a case-mortality of 44·4 per cent. Although fatality-rates have varied considerably in different outbreaks, they have rarely, in any large series, been below 25 or 30 per cent. for all age-groups. Such figures are already of mere historical interest. Chemotherapy has changed all that. In a mixed series of cases, otherwise in reasonable physical condition, skilfully treated with sulphanilamide or with M. & B. 693 a case-mortality of 5 per cent. or even less should not be unattainable. Age-groups should now count for little in prognosis except in so far as they are associated with concurrent disease or low vitality.

PREDISPOSING CAUSES

The outstanding factors predisposing to cerebrospinal fever are overcrowding, insufficient ventilation, nasopharyngeal catarrh, the recent introduction of susceptible persons—e.g., recruits—into a community, and the presence of a highly virulent organism. For over a century epidemics among troops have been observed to be associated with overcrowding in barracks. The epidemics of 1915–18 among the soldiers in training, quartered in huts and tents, in this country were shown by Glover (1918a) to be closely correlated with severe overcrowding in sleeping-quarters—i.e., a space of less than 1 ft. between beds—with, at the same time, obstruction of ventilation owing to the lighting restrictions. The spacing out of beds to 2½ ft. apart, combined with simple methods of improving ventilation—e.g., by fixed open hopper windows—led to the complete absence of cases during the winter months at Caterham, while neighbouring overcrowded units had sharp outbreaks. The lesson is salutary in the present circumstances of renewed war conditions and an intensified blackout. If a time of special stress arises and many men are called up, there will be danger of an epidemic. An effort should be made at all costs to maintain the spacing of beds and proper ventilation in sleeping-quarters containing newly joined recruits.

Even these measures may fail, however, in the presence of other adverse conditions. Whittingham et al. (1931) described an outbreak among R.A.F. recruits sleeping in huts with beds 3 ft. apart and windows left open day and night. The weather was cold and foggy, and a liberal allowance of coal had been issued. In the centre of each hut there was a fireplace, round which the men congregated in the evening. The outbreak comprised 12 cases, distributed through several huts, and in every case but one the affected airman occupied a bed in close proximity to the fireplace. A search for carriers showed that most of them also occupied beds in this vicinity. The area round the fireplace in each hut appeared to be a distributing centre of infection. Another main source of infection was the overcrowded canteen, and its closure was followed by abrupt cessation of the epidemic.

Peters and Gunn (1929), in the Glasgow epidemic, similarly incriminated an ill-ventilated recreation hall or club-room frequented by youths of fourteen to eighteen. This severe epidemic, with a case-mortality of 83 per cent., was typical of civil outbreaks. The cases were practically confined to small overcrowded houses of three rooms or less and were widespread throughout the poorer quarters of the city, the better-class districts being completely exempt. Multiple cases occurred in only two families, both of which were particularly badly housed.

Nasopharyngeal catarrh, another predisposing factor, is not due to the meningococcus but to other organisms. The inflammation probably reduces the phagocytic activity available against the meningococcus and aids its absorption into the blood-stream. Coughing and sneezing aid the dissemination of meningococci from throat to throat. This rapid passage has probably some influence in raising the virulence of the organism, although not by any means invariably. Gordon (1918) did not observe an increase of virulence in three out of four passage experiments in animals. McLean (1939), however, observed in the Cyprus epidemic many instances where it was only the last victims of the common catarrhal infection inside a family circle who developed meningitis.

The introduction of non-immunes into the herd is a factor whose apparent influence is seen in the high incidence of cerebrospinal fever among recruits and in naval depôts, as compared with that among the equally crowded but more seasoned troops on active service or among the packed crews of warships at sea. In such cases the influence of psychological factors—e.g., worry, strain and anxiety—among newcomers to the services cannot be wholly discounted.

INFECTIVITY AND CARRIER-RATES

"It is unusual for a patient to have been infected by another patient suffering from cerebrospinal fever. The great majority of infections are derived from persons who, for the time being, are unrecognised carriers of the meningococcus" (Ministry of Health 1931). Netter and Debré (1911), on the evidence then available, suggested that carrier-rates in a community corresponded with the intensity of an outbreak. Arkwright (1915) considered that there was first an epidemic of saprophytic meningococci in the nasopharynx, and then meningitis appeared "as an epiphenomenon associated with increased virulence." Glover (1918b) used a picturesque phrase: "the meningeal cases are the visible foam in the dark carrier-rate wave." From his experience in military encampments in the last war he concluded that a carrier-rate of 20–60 per cent. was usually found in severe overcrowding, and that a 20 per cent. carrier-rate was a sign of danger which usually preceded the development of cerebrospinal fever. Although this standard may still be a valuable guide under similar conditions —e.g., among troops in training—many subsequent observations have shown that it is not reliable. Thus Dudley and Brennan (1934) found a 13 per cent. carrier-rate in Chatham Naval Hospital associated with 11 cases of meningitis, whereas in the following season no cases of meningitis developed with a carrier-rate of 54 per cent. and a change of the organism from type II to type III. During this latter period at the Naval Hospital, Portsmouth, there were 6 cases of meningitis with a carrier-rate of only 5 per cent. Clearly it is not solely a question of numbers of carriers but also of the virulence of the organism; and the latter factor is far from easy to determine in routine surveys. Dudley considers that at Chatham a strain of high infectivity had a low virulence or invasiveness, whereas at Portsmouth the precise opposite obtained. The normal flora of the nasopharynx has been studied by Straker et al. (1939) over a period of seven years, and in a mixed population of normal healthy adults, public-school boys, and infants in an orphan home meningococci were found in 6–26 per cent. of swabbings. Among the 100 normal London adults studied the carrier-rate was over 15 per cent. Do carriers become clinical cases of meningitis? Fildes (1918), who had found nasopharyngeal swabbings all negative two to seventy-five days before the onset of cerebrospinal fever in 26 persons, concluded that patients were seldom carriers before the onset, and that the incubation period of the disease must usually be short.

THE MENINGOCOCCUS

This group of organisms is generally differentiated by agglutination tests from pharyngeal cocci closely resembling it, but it is a complex group, and its limits have not yet been defined. The serological differentiation of the parameningococcus of Dopter (1909) was followed by Gordon's four types, which included 98 per cent. of 526 strains isolated from cerebrospinal fluids of adults during the last war. Subsequent experience revealed greater antigenic overlap among the pathogenic meningococci, and it is now usual to adopt Griffith's (1917) broad classification into group I (types I and III) and group II (types II and IV). In my series of cases 1933–39, meningococci isolated from blood or from cerebrospinal fluid by Dr. J. E. McCartney were 68 group I, 37 group II, 4 inagglutinable, and 1 anomalous. The last-named was atypical morphologically and culturally, was agglutinated by both group sera, was unaffected by serum treatment, and brought about a fatal issue. Various pathogenic intracellular constituents of the meningococcus were studied by Gordon (1920), who concluded that an endotoxin was the most powerful toxic agent, and that the efficiency of a therapeutic serum depended on its content of type—specific anti-endotoxin. Ferry et al. (1930) isolated a soluble toxin from broth filtrates of young cultures of the four types and with this prepared a therapeutic polyvalent serum, which he claimed to be antitoxic.

At the onset of cerebrospinal fever, the meningococcus is constantly present in the nasopharynx of the patient and, as a rule, is of the same serological type as that isolated from the blood and cerebrospinal fluid of the same patient. Invasion takes place through the blood-stream and choroid plexus. The bacteræmia is usually short, a matter of hours, but may be prolonged for several days, or in rare cases for weeks, before the onset of meningitis. Chronic meningococcal septicæmia occasionally develops; it may precede meningitis, may follow it as a relapse in early or late convalescence, and sometimes passes off without causing meningitis.

DIAGNOSIS

Early diagnosis is still essential to ensure the best results of treatment. In the presence of an outbreak a papular or a petechial rash, with pyrexia, irritability, and hyperæsthesia, is an indication for blood-culture and lumbar puncture. The onset of meningitis is usually associated with severe headache and nuchal rigidity. The latter may, however, be slight and easily missed in the early stage, especially in infants and young children. Headache, with pain and tenderness on flexing the head, even without rigidity, should always suggest a lumbar puncture.

TREATMENT

In the last two years chemotherapy has revolutionised treatment and radically improved the prognosis. Cure may, as a rule, be obtained at all ages, is rapid, and, with the single exception of deafness, rarely accompanied by permanent sequelæ. This statement can at present, however, be applied only to two drugs, sulphanilamide and M. & B. 693, for they alone have been shown to be highly active against meningococcal infections in the laboratory and, in large series, fully curative in man. Caution should be exercised in the use of other sulphonamide preparations in this highly dangerous disease, until they have likewise been proved to be of equal or superior value. The two drugs of proved potency, sulphanilamide and M. & B. 693, give equally good results when used in correct dosage.

The question of dosage, as well as the choice of drug, is vital. The dose of sulphanilamide should be high, near the limit of tolerance—e.g., 9 g. a day for an adult—for two and a half to three days and then very gradually reduced over the next six days. The drug should seldom be required, and has little effect, after the ninth day of treatment. It should never be stopped because of such difficulties as cyanosis, vomiting, disturbance of deglutition, or cerebral symptoms; otherwise there is danger of the organism becoming drug-fast. Agranulocytosis appears to be a much smaller risk than in puerperal fever, and a high initial dose is thoroughly justified. A third vital rule is that initial dosage in infants and young children should be much higher proportionately than in adults. Infants tolerate easily 3 g. a day for the first three days. The dosage of M. & B. 693 should be similar to that of sulphanilamide; but, since it is a more

active drug, lower dosage is often effective. This matter of dosage and of the preparation used may be of vital practical importance to the services within the next few months.

A brief comparison of results may make the position clear. Using sulphanilamide and M. & B. 693 alone, without serum, I have treated 80 consecutive patients, of all ages, of whom 5 have died (Banks 1939); 2 of the deaths took place within three hours of admission, and 2 in elderly men with severe intercurrent disease. By the kindness of Dr. E. L. Sturdee, I have seen the records of the cases treated by drugs alone in hospitals throughout England and Wales during the same period. The preparations used have included practically all the marketed varieties of Prontosil and sulphonamide preparations, and dosage has varied widely, usually being lower than that mentioned above, particularly in infants. The cases numbered 100, and the case-mortality was 29 per cent. Although there are differences in age-incidence in the two series, that is now a relatively unimportant factor, and the difference in case-mortality is too great to be explained by chance variation.

Serum.—I have concluded from my own experience that serum treatment is now unnecessary, even as an adjuvant to chemotherapy. It is expensive and bristles with difficulties, whereas chemotherapy is cheap and relatively easy, once the principles of dosage have been mastered. Intrathecal administration of serum is often dangerous because of the aseptic meningitis and spinal block which may be produced.

PROPHYLAXIS

Mass segregation and disinfection of carriers, largely practised during the last war, are now generally regarded as a vain endeavour because of the numbers involved and the meagre results obtained. Occasionally, as Glover (1931) has pointed out, a "causal carrier" can be identified—e.g., a soldier home on leave who has infected his child. Segregation is indicated in such a case. A positive intradermal test with Ferry's toxin in high dilution has been held to indicate susceptibility to the disease. Negative tests are reported to have been obtained after active immunisation with repeated doses of the toxin, and immunity has been presumed (Ferry and Steele 1935, Kuhns 1936). It has not, however, been shown that immunity to the meningococcus is a stable condition in varying circumstances. Experiments in the inoculation of troops with vaccines before or during epidemics have been undertaken in Africa and India. McLean and Bevan (1939) had some moderate success with inoculation in Cyprus but concluded that no satisfactory wide-scale inoculation experiment and its effect in controlling an epidemic had yet been reported. It appears certain that inoculation, to be effective, must include a large proportion of the population, so large that it may well be considered impracticable. Prophylactic measures likely to prove most fruitful at present among the forces, especially where there are recruits, are the hygienic measures already indicated: the spacing of beds in sleeping-quarters, ventilation, and control of overcrowding at critical times in ill-ventilated halls and canteens. Such measures, combined with facilities for early diagnosis, and prompt and skilled chemotherapeutic treatment may well control this once dreaded disease to an extent never before attained among armies in the field. Given these conditions, moreover, the vast majority of patients may be expected to be fit for service again within two months of onset of the disease.

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SPECIAL ARTICLES

A PSYCHIATRIST LOOKS AT HITLER

PSYCHIATRY has outgrown the phase of dilettantism when it believed it could explain every peculiarity of human nature by selecting a label from its terminology. Dissecting the genius and forcing the pieces into a rough formula, and searching for pathological scraps in the waste-paper baskets of the great is utterly out of date. "Pathography" of this kind, if done without modesty, has been compared with the irreverence shown by a little dog in lifting its fourth leg at the corner of Cheops's pyramid—and I think quite properly.

Psychological and psychopathological factors, sometimes neglected, should not be overvalued; the expert knows (or should know) how limited our knowledge is and how often we have to confess our ignorance in everyday cases. Historical figures, dead or alive, and their actions are not only the product of their "personality make-up." Social, economic, ethical, religious and philosophical factors are just as influential on behaviour and sometimes even more important than psychology. Because these factors present themselves through the medium of the personality, this does not mean that the psychologist can judge them better than the historian. Only if one regards psychology as the medium through which they act or if there are strikingly abnormal features present—as in Adolf Hitler's case—can the psychiatrist hope to make events better understood.

But even then one has to be on guard against seeing more than there is to see and against the appearance of relieving the subject of the responsibility for his actions. It is tempting to build up a diagnosis from literary documents and from events of which one knows only the outside. Neither the most detailed reports of friends nor descriptions of objective observers can replace the personal impression the patient makes on the experienced psychiatrist who trusts his own judgment more than anything else. Furthermore psychiatry must be defended against the reproach that by finding certain pathological features in a person one is placing him outside normal

responsibility for his deeds. This is certainly not true in border-line cases which today form such a large part of the psychiatrist's clientele. The medical man should never usurp the rôle of the judge because he is looking a little closer into the thicket of motives.

DIAGNOSIS

Having made these reservations I shall take the shortest way by making a bold diagnosis and trying to support it by facts as far as they go. The classification of Hitler as a "hysterical personality," proposed years ago by authorities who followed his ascent at close quarters, seems to me still to cover all that psychiatry can disclose in this case. The term "hysterical personality" seems vague because of the wide use of "hysteric" inside and outside medicine; but it seems to me preferable to the French "mythomanie" which means something similar, but is at the same time a much narrower concept.

KRAEPELIN'S DESCRIPTION

The classical picture of the hysterical personality is given in Kraepelin's textbook. Because of its purely descriptive character, avoiding all speculations, I shall use the following excerpts as a first approach to our subject.

(1) Kraepelin found no anomalies of *intelligence* among 164 hysterics on whom tests were applied. There is no disturbance of apperception or reasoning. On the contrary, hysterics are especially versatile mentally and have a lively phantasy and imagination. Their interests are unsystematic and superficial, but have a wide range; they are extremely adaptable to any situation, but lack steadiness and endurance. Hysterics are attracted by everything that is new, by persons in the limelight and by spectacular happenings. They are credulous and devoted; throughout history hysterics have been the first believers and the most passionate fighters for miraculous creeds. Others show insatiable curiosity and special skill in probing into personal secrets. They are constantly interfering in other people's affairs, inveterate gossips and scandal-mongers. Their main interest is in keeping themselves in the public eye and in finding some new and sensational way of doing so.

(2) The hysteric's *mental associations* are of a flat *superficial* type; they are jumpy and entirely self-centred. The judgment is coloured by first impressions, by unessential accessories and largely influenced by the personal element. Although at times obstinate and impervious to reason the hysteric may quickly and completely change his principles which are never deep-rooted.

There is a tendency to *day-dreaming*, probably connected with the liveliness of imagination. Hysterics like to picture themselves in unreal situations which they fill in with a wealth of vivid detail. They indulge in dreams of being the hero of spectacular events or the victim of shameless attacks. They translate their phantasies into reality by boastful fabrications and by arranging confirmatory evidence in support of their story.

(3) The *memory* of hysterics is *unreliable* because it is so entirely dependent on emotional factors. An extreme tendency to forget the disagreeable, to distort and embellish the past according to personal wishes, is typical. This may be done deliberately at first, with the conscious idea of taking in the listener. Later his phantasy runs away with him and he becomes so intoxicated with his narrative that he is unable any longer to distinguish between fact and fiction.

(4) The hysteric shows extreme *excitability* of the *emotions*. His affective response is uncontrolled and seems exaggerated. He is passionately sentimental in his loves and hates. His environment trembles in fear of his wild outbursts and violent tempers. He is easily moved to tears and quickly offended. His mood changes frequently and unpredictably, and always the patient wallows in joy or misery. Side by side with this wealth of emotion, an astonishing *callousness* may be seen, the "belle indifference" of the hysteric, which allows him "to walk smiling over corpses" when his personal feelings are not touched.

A possible explanation of this contradictory behaviour may be the disproportion between expression of emotion and the underlying emotion itself. Exaggerated movements of expression are a kind of habit in the hysteric. There is a drive for ever increased utterance to express the internal excitement. The exuberantly sentimental behaviour does, however, not correspond to the real feelings and the strongest emotional expressions are constantly misused.

(5) The *centre* of the hysteric's mind is always and solely *his own person*. His increasing self-esteem is incessantly craving for approbation and applause. He is always putting on airs and trying to attract attention to himself. Everything he has to deal with is shifted to a personal level. A casual acquaintance becomes the occasion for confidential confessions; if he does not find the expected interest, he feels rebuked and takes offence.

The hysteric is *never satisfied* in his wishes, always covetous and longing for the adventurous, the extraordinary and for whatever distinguishes him from others. He knows how to achieve small and big personal advantages and how to tyrannise his surroundings in every possible way.

Favourite means of hysterical personalities in their struggle for appreciation are self-denial and martyrdom. They sacrifice themselves in a blatant way by helping the poor and saving the destitute. They are willing to humiliate themselves for something that they regard as a great benefit to humanity—and they expect acknowledgement. This explains the frequency of hysterical personalities among nurses, conventuals and social workers. They also enjoy their own mental and physical sufferings and get a certain satisfaction from being misunderstood and unkindly treated by their doctors and relatives. This is the attitude of the hysteric towards his illness. He loves suffering for the importance that it gives him, but at the same time he protests how much he would like to be cured.

(6) *Suggestibility* is an important factor in the psychology of the hysteric, so much so that some authors have tried to make it the basis of all the contradictory features of this type. It is unnecessary to describe his ability to adopt symptoms from other patients, or to prolong his own physical illness by autosuggestion. At the same time the hysteric has an extraordinary power of conveying suggestions to the persons of his environment. He creates a milieu in which an interaction of suggestive influences takes place and it is impossible to decide which is the active and which the passive partner. One knows that most mediums of psychic seances are hysterical personalities. The striking influence and personal charm of some hysterics is certainly based on their inborn mastery of suggestion.

(7) In spite of the abundance of superficial emotional display, there is a *blunting* of natural *instincts* in the hysteric. They can be indifferent to hunger, fatigue and want of sleep. Sexual desire may be absent or perverted. The well-known cases of operation mania with a railway map of scars on their abdomen show the hysteric's indifference to pain. The spectacular suicidal threats and attempts are not

always harmless; they are one of many signs of the low ethical standard of many hysterical personalities.

FITTING THE CAP

I have thought it better to give this abbreviated and free translation from the famous textbook as a compact whole and not to interrupt it by illustrating facts from the life history of our case. I omitted the more severe psychotic hysterical symptoms and the physical signs. It will be seen that the latter were also found in our patient, at least on one occasion.

Many features in Kraepelin's mosaic need no illustration at all because the respective facts and activities of Hitler are common knowledge. A few examples and complemental remarks may be added to each paragraph.

(1) *Superficial diffuse intelligence.*—Hitler's book "Mein Kampf" is a typical product of a poorly educated versatile and superficial intellect. It deals with art, music, theatre, education, politics and so on in the most perfunctory manner. Hitler's endeavour to improve or reform all this, to influence religion, architecture and science, after he came into power, exhibits the same type of half-read shallowness and frivolous adaptability. His credulousness can be exemplified by his favouring Federn's economic reform of interest, his ardour for vegetarianism, anti-alcoholism, his belief in astrology and—last but not least—in Houston Chamberlain's race doctrine. A systematic service for denunciation like the Gestapo may be indispensable for any tyranny, but at the same time it satisfies personal curiosity and scandal-mongering. The spectacular way in which the chancellor of a great nation deals with some notorious homosexuals in his entourage in the purge of 1934 is only conceivable as the histrionic self-abasement of the hysterical personality.

(2) *Day-dreaming and imagination.*—The omnipotent dictator differs from the hysterical parlour-maid because he is able to realise many of his dreams. But even then he boasts that his Third Reich will last a thousand years and he demolishes whole towns unscrupulously only to rebuild them according to his personal wishes. How often has Hitler worked himself up into a frenzy of fury against imaginary enemies! They are indispensable for the hysteric to kindle his emotional fire. A striking example of his sentimental confabulations is the famous story that he took a taxi to save a little child in the street when he slipped away from the bullets which killed a number of partisans during his putsch on Nov. 8, 1920. The child has never been found.

(3) *Unreliable memory.*—It seems sufficient to mention here Hitler's innumerable distortions of his own and his people's history. I would like, however, to emphasise the fact that the hysteric has, unlike anybody else, the faculty of believing in his own lies. His mendacity is something very different from the deliberate lying of the average man or from the purposeful fraud of the refined impostor. The mendacity is so essential a feature in the make-up of the hysteric that it radiates into everything he perceives, thinks, feels and does, and places him outside the ordinary order of true and false.

(4) *Excitability of the emotions with callousness.*—Whenever one listens to one of the Führer's speeches one observes the complete absence of the middle notes. He appears to be either on the pitch of emotionality or icy cold. "He can laugh and cry whenever he will, he can simulate a deep emotion and manufacture an outburst of rage; he can artificially grow heated or make himself inflexible and rigid. Although he sheds tears on any suitable occasion, he boasts when in high spirits that he has not cried for years. With stiff outward calmness, he manages to work himself up into an inward rage which shoots, so to speak, out of the barrel at the right moment" (C. Heiden). There is a wealth of further illustration of this point in his proclamations and speeches, his technique of talking down foreign statesmen and so on. Dissociation of the emotional expression from the emotion is absolutely necessary if one is to repeat the same arguments with the same affect over years to hundreds of audiences as Hitler did on his way to power. Here the psychology of hysteria touches that of theatrical acting. And it is not without reason that some great actors have been or are hysterical personalities if judged from the point of view of medical psychology.

(5) *Egocentricity and dissatisfaction.*—What has been called Hitler's megalomania seems to me psychologically well explained in Kraepelin's description. His unsatiable ambition even after he is in full power is typical. His pushing restlessness may have been necessary to keep the masses to the point, but it also corresponds to his own temperament. The turn to his own age when discussing the possibility of war with Sir Nevile Henderson (White Book No. 23) shows the characteristic reasoning of the hysteric who can never abstract from his own person. The demonstrative frugality of Hitler's conduct of life, his simple uniform, his refusal of titles are examples of hysterical modesty calculated to impress the public. The story that Hitler refused for a long time to become the "Führer" of the Nazi movement and wanted to remain the "drummer" seemed well invented if it is not true. The peculiar fact that Hitler did not rise above the rank of a corporal during the last war may be due to the same attitude.

His constant complaints of being misunderstood by his adversaries, his mastery in inventing persecutors and foes, and in fabricating atrocity stories for the sole purpose of stimulating pity, indignation and wrath need no proof.

(6) *Suggestibility.*—The rôle of suggestion in Hitler's career and success can scarcely be underrated. He is using it with the instinctive skill that only hysterics possess. He plays the instrument of psychological influence not only on masses but on single persons he meets with splendid mastership. Many of his adversaries report of his personal charm which is inconceivable if one knows him only from photographs. No doubt the talent in practical psychology which we so frequently see in psychopathic personalities is a special gift which can render them highly dangerous.

(7) *Blunting of the natural instincts.*—There is little authentically known about Hitler's sexual life. Nothing is known of relations with the other sex before he came into power and, in contrast to his co-dictators Ataturk and Mussolini, women do not seem to play any important rôle in his life since Ataturk was a bachelor, surrounded and much under the influence of independent lady friends; he stood for female emancipation in Turkey. Mussolini adores the motherly woman and lives a model family life. Hitler is a bachelor who despises women in general and only adores the motherly female. There is an obvious flaw in his sexuality of which speculation on the psychopathology of his hysterical make-up could easily make use.

FURTHER SYMPTOMS

Hitler is suffering from severe insomnia which does not seem to impair his working capacity. His proverbial parsimoniousness of conduct in life is not

believed in by Heiden who seems very well informed. He regards him as lazy, incapable of systematic work, but restless for variation's sake. Besides these traits typical of the hysteric, he is certainly almost immune against fatigue.

Suicidal threats by Hitler were frequent occurrences during the first difficult years of the Nazi movement. Their dramatic circumstances and their lack of genuineness—as described by Heiden—are so characteristic that the episodes could be used as textbook examples of hysterical behaviour.

Heiden gives a short account of Hitler's blindness in 1918, an episode which was well known in Germany long before Heiden's biography was written. In October, 1918, his company was gassed; some of his comrades died, others became blind. Among the latter was Hitler who however recovered his sight after a few days. People who should know regarded his blindness as a hysterical one. According to a narrative the origin of which I cannot trace, he was cured after a vision of St. Mary who promised him recovery of his sight provided he would always remain the "drummer" and never aspire to the rôle of the leader. This episode of conversion hysteria serves to round off the clinical picture and the diagnosis seems well established.

AGE OF ONSET

There is, as far as I can see, only one fact which does not fit well into the clinical picture, but which cannot be passed over. It is very unusual for the signs of a hysterical personality to become apparent only after the age of thirty as in Hitler's case. As a rule the hysteric shows his true nature from childhood onwards and displays the characteristic traits clearly enough at adolescence. If we had a better and more detailed early history of Hitler, we might be able to trace some of his outstanding features backwards. What we do know for certain is that Hitler as a young man was not able to make use of his psychological outfit; he could not gain admission to the Vienna Academy of Painting or get any situation in civil life where he could earn his bread and cheese. During four years he lived in small lodgings, in a casual ward and in a home for unemployed men in Vienna. In Munich he slept on a sofa in a friend's room for a year, also without regular occupation, until the war broke out and rescued him from the useless existence of a stranded artist. He was equally unsuccessful in the army where he remained all the time a corporal and an orderly. Heiden reports the verdict of his captain: "I shall never make this hysteric a N.C.O.!" Thus the nature of his personality was recognisable, but it had then only a negative effect on his situation in life.

There are possible explanations for this delay of development in the present case. Their discussion would lead into the psychopathology of hysteria, a large and very controversial topic. It seems to me more important to say a few words about

DIFFERENTIAL DIAGNOSIS

"Thirteen prominent American psychiatrists have publicly diagnosed Adolf Hitler (at long distance) as a paranoiac" (the American magazine *Time*, Oct. 30, 1939, p. 63), and Dr. William Brown (*Times*, Oct. 19, 1939) speaks of "a paranoid tendency." It is difficult to see on which "delusional" ideas of Hitler's one can base such a diagnosis. I do not know of a psychiatric illness in which delusional ideas, for instance of persecution, are so well adapted to the actual needs of the political situation, of propaganda and so well formulated for incitement of the masses. "Encirclement" was to him just a new suitable slogan as was "self-determination" before. The Bolsheviks were his eternal enemies yesterday as are the British today. There is no delusional system, nothing fixed, but everything pliable and topical. He lives in fear as tyrants have lived at all times when their power was founded on intimidation. Who can be sure that his persecutory ideas are really delusional?

If however the diagnosis of paranoia is more than the name for a few less important symptoms, it implies the diagnosis of a severe psychiatric illness leading to mental collapse. From the material at my disposal, I cannot see any sign justifying the diagnosis of one of the severer psychoses with paranoid features. None of the known paranoiac geniuses had large masses or even a considerable part of any nation as their personal followers. They were either solitary like Rousseau or Strindberg, or surrounded by a small group of admirers like Swift or the Swiss sectarian Anton Untermeyer.

THE FUTURE

The prognosis of the hysterical personality depends more than that of any other psychopathological reaction type upon the environment. From this truism alone one is tempted to give up when confronted with a hysteric of the calibre of Hitler. There is the further difficulty of the patient's age. When hysterical personality make-up manifests itself for the first time in a boy who has difficulty in fitting into a professional career, or in a young wife who is making the life of her husband and family a hell, the psychiatrist does not regard the case as entirely hopeless. There are often possibilities of changing the environment, of sending the young man overseas, of separating the married couple, and so on. Other cases respond well to a systematic psychotherapy. Every psychiatrist has known patients who without either of these procedures outgrew their peculiar type of reaction like a childish illness, giving up their more or less asocial behaviour and becoming good "bourgeois." The hysteric wandering from one consulting-room, nursing home or hospital to another, hysterical bankrupts, swindlers and forgers have a very poor prognosis. It is, however, worth remembering that the socially well adapted type of hysterical personality really exists among nurses and other social workers, among actors and all kinds of showmen. The possibility of adaptation, however small, with or without the help of a psychotherapist, should not be denied in the average case.

Outstanding hysterical personalities have, thanks to their suggestive influence and the "miraculous" flavour of their physical symptoms, played a great part in religious and pseudo-religious movements. To mention only two of the great, Saint Theresa and Joan of Arc. The latter touches the political sphere in which figures of the hysterical type have been extremely rare in modern times, as far as I know—but I am no great historian. The fact that a man of broad outlook and great experience of human beings like Sir Nevile Henderson did not see through the true-hearted surface of the impostor, seems to confirm that hysterics are seldom found among politicians and statesmen. One has probably to go back as far as to the Roman Empire, to figures like Tiberius, Claudius or Caligula to find dictators of a similar type. From these one might get some indication of the outlook in our case. The prognosis then is much more a problem for the historical scholar than for the psychologist, who is after all not an astrologer but only a scientist.

MEDICINE AND THE LAW

House-to-House Collections

HOSPITAL appeal organisers will doubtless have noticed that the operation of the House to House Collections Act, originally framed to take effect at the New Year, is postponed to March 1. With hospital "flag days," of course, the act has only a limited concern. Its title emphasises what its text conceals—namely, that it does not apply to street collections (which will still be controlled by Home Office regulations under other statutes) or to postal appeals. The genesis of the act was due to the disclosures of the official report on fraudulent charitable organisations. A type of trickster had arisen who preyed all too easily on the generosity of the public. He chose a high-sounding name for his swindle, all the more respectable if it incorporated the word "national," and all the more attractive if it mentioned the widow, the fatherless or the destitute. He set collectors at work with a fat commission for themselves. So lucrative was the traffic that collectors soon learnt enough to set up business profitably on their own account. The minimum of charitable disbursement cloaked the maximum of predatory collection. Undesirables who extracted thousands of pounds from kind-hearted folk for a supposed charity in aid of the destitute could apparently obtain immunity from the law of false pretences if they fitted up a single bunk and persuaded a single tramp to sleep there for a single night.

Another dubious practice was the scheme for collecting various articles from householders on behalf of hospitals. This sometimes began as a charity and ended as a commercial undertaking. The new law, as originally designed, may or may not have been intended to control all the evils which recent investigations have revealed. Its terms, as finally enacted, suggest that there may have been some narrowing of scope. The statute speaks throughout of "a collection for a charitable purpose." Not until the eye lights on an inconspicuous list of definitions at the end does one learn that "collection" means only "an appeal to the public made by means of visits from house to house. . . ." "House," by the way, includes a place of business.

The substance of the act can be briefly stated. All charitable collections from house to house must be licensed by the local authority or in London by the Commissioner of Police of the metropolis. A purely local collection of a minor and temporary nature can be conducted on the authority of a certificate given by the local chief of police. Where the charitable purpose is pursued throughout the whole or a substantial part of England (or of Scotland) and it is desired to promote charitable collections for that purpose, the Secretary of State may by order exempt the appeal from the requirement of licensing. Other provisions deal with the abuse of badges and the duty of collectors to furnish their name and address to the police on demand. The regulations, already published, of the Secretary of State cover the arrangements for collecting-boxes, receipt-books, "envelope collections" and the furnishing and vouching of accounts. The promoter is made responsible for the character and behaviour of his collectors. Nobody under 18 is to collect in London or under 16 elsewhere. Thus the system of house-to-house collections is at last controlled like that of street collections.

Genuine charities like our great voluntary hospitals in London and the provinces have little to fear from the new law. Their cause will benefit by the elimination of fraudulent appeals.

Silicosis Compensation

Legislation which is to impose burdens upon industry must not be loosely drawn. The converse fault of excessive particularity seems to be displayed by the Various Industries (Silicosis) Scheme under the Workmen's Compensation Act. The exact processes to which the scheme shall apply are set out in two complicated pages. Lord Justice Slesser, in a case before the Court of Appeal in the last days of the December sittings, criticised the scheme for not being quite comprehensive enough. A workman disabled by silicosis had been employed to break down and rebuild the furnace walls of a foundry. The walls were made of silica brick and had to be reconstructed with fresh bricks of the same material. Sub-heading (vi) of the 1931 scheme mentions "breaking, crushing, grinding . . . or packing of silica rock . . . or any dry admixture containing such materials. . . ." Sub-heading (vii) mentions "breaking, crushing or grinding of flint or materials containing ground flint. . . ." It did not appear that either these or other specified processes precisely applied to what the applicant had been employed to do. He had contracted silicosis in the course of his employment and had been awarded compensation. The three members of the Court of Appeal found themselves regretfully obliged to cancel the award on the ground that the scheme had not mentioned the particular operation in which the workman was engaged. Lord Justice Slesser's comment that the scheme called for reconsideration in the light of the case under review will doubtless not be lost upon the Home Office and Parliament.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

GAS WARFARE

Prof. J. P. Kendall, who occupies the chair of chemistry at Edinburgh University, has delivered a lecture on gas warfare on civilian populations. He said his aim was not to kill the booby of gas warfare any more than a book on swimming aimed at killing the booby of death by drowning. But he could assure his audience that there was hardly any danger from gas, however ruthlessly employed, to the person protected by a civilian respirator who knew enough about gas not to be misled. The average civilian in a house was comparatively safe from gas. If civilians refused to panic the whole object of gas attack would be lost. Of all the claims regarding gas warfare only two had been established since the last war. The Italians used it in Abyssinia because it was essential to finish the war before the rains. The Abyssinians had no gas-masks and little clothing, and the climate was warm—ideal for mustard gas. The Russians had lately used gas against the Finns which was stupid because the temperature was not suitable. It was true that a ton of poison gas could do a tremendous amount of damage to civilians, providing they stood in line with their tongues out. Similarly one steam-roller would flatten out the whole population of Edinburgh if they stood in front of it. He described the failure, after the first surprise attack, of gas when used by the Germans in the last war. He compared the figures for casualties in road accidents with those in gas warfare and said that if anyone was inclined to panic

at the sight of an aeroplane he should climb a tree at the approach of a bus.

RETIREMENT OF MR. HENRY WADE

Mr. Henry Wade, who has retired from the surgical staff of the Edinburgh Royal Infirmary, has been on the staff since 1910 and a full surgeon since 1925. In an appreciation of his work Professor Gulland told the managers of the Infirmary that Mr. Wade had early turned his attention to the investigation and treatment of disease of the kidney and related organs. In 1923 he was placed in charge of the diagnostic theatre and soon converted it into a special department for urological diagnosis. Along with many assistants whom he had gathered around him he made a special reputation for Edinburgh in this direction. This had been greatly helped by his personal popularity abroad, and his recognition by surgeons everywhere was evidenced by his receiving honorary fellowships of the Royal Colleges of Surgeons in Ireland and of Australia as well as of the American College of Surgeons. He had treated his patients with consummate skill, taught students with kindly wisdom, and helped his colleagues with example and advice. The managers accepted his resignation with regret and thanked him warmly for his services.

IRELAND

(FROM OUR OWN CORRESPONDENT)

TARIFF ON SURGICAL MATERIAL

EARLY last summer the government of Eire imposed a heavy tariff on the importation of ligatures and sutures for surgical use. The admitted intention was to give the support of protection to a firm which had just been established in Ireland for the manufacture of such products, none of which had previously been made in the country. The surgical profession had no knowledge of the proposed tariff—50 per cent. ad valorem on British products and 75 per cent. on American—until the duty was actually in force, and they were faced by a sudden and considerable rise in price if they were to continue to use the materials to which they were accustomed in preference to a new product of which they had no experience. There was much discontent among surgeons in that a change of such importance should have been made without any preliminary consultation with any representative body of the profession, or in fact with anyone who could express an expert opinion.

The machinery of imposing tariffs in Eire is in some respects peculiar. A tariff is, in the first instance, imposed by what is termed an "Emergency Order" on the mere authority of a minister, and it may be in force for many months before confirmation of the order is sought from parliament. In this instance the duty had been in force for some six months before it came before the Dáil and Senate for confirmation. Objections were raised in both houses, mainly on the ground that there had been no consultation with representatives of the surgical profession. In reply the Minister for Industry and Commerce, speaking in the Senate, made the defence that his department had consulted the department of Local Government and Public Health, and that it was assumed that the latter department was competent to advise. This contention did not satisfy Senator Rowlette, who remarked that however competent the officers of that body might be in regard to public health and other matters of which they had experience, none of them had any recent experience of surgical technique, and could not be regarded as experts. The minister undertook to consider, if such a question arose again, the practicability of consulting some representative professional organisation in advance of issuing an order. It is right to add that no complaint appears to have been made of the quality of the products of the Irish firm.

UNITED STATES OF AMERICA

(FROM OUR OWN CORRESPONDENT)

AN EXPERIMENT IN INFECTION WITH TUBERCULOSIS

AN unusual opportunity to study contact infection in tuberculosis under controlled conditions has recently been afforded in New York state. An interim report was presented by Drs. R. E. Plunkett, G. W. Weber and W. Siegal of the New York state department of health and by Dr. Rose R. Donk of the Newark state school at the convention of the American Public Health Association. The Newark institution contains 2300 mentally defective inmates, few of whom are ever discharged. Contact is close within each ward but casual with inmates of other wards. The report covers a period from February, 1936, to March, 1939. An intensive investigation was begun in April, 1937, when all admissions and previously negative reactors were tuberculin tested and all new and previously positive reactors were X rayed. For 18 months, owing to inadequate accommodation, it was impossible to isolate all known active cases. It has thus been possible to compare conditions when inmates were or were not exposed to contact with active cases. In the period of approximately thirty-eight months, 25 new cases of tuberculosis developed, all among inmates who had been exposed during that time to active

INCIDENCE OF REINFECTION TYPE TUBERCULOSIS, BY SEX AND EXPOSURE TO INFECTIOUS CASE

Period of observation	Person-years observed, tuberculin neg. and pos.			Cases					
				Total		Male		Female	
	Total	Male	Female	Number	Rate†	Number	Rate†	Number	Rate†
	Exposed to infectious case								
Feb. 1936–March 1939	3382	1111	2271	25	7·4	9	8·1	16	7·0
Feb. 1936–April 1937	1185	214	971	10	8·4	3	14·0	7	7·2
April 1937–Oct. 1937	552	147	405	6	0*	1	10·1*	5	12·3
Oct. 1937–April 1938	633	248	385	5	0*	3		2	3·9*
April 1938–Oct. 1938	661	270	391	1	0*	0		1	
Oct. 1938–March 1939	351	232	119	3	0*	2	4·0*	1	*
	Not exposed to infectious case								
Feb. 1936–March 1939	1441	1048	393	0	0	0	0	0	0
Feb. 1936–April 1937	562	457	105	0	0	0	0	0	0
April 1937–Oct. 1937	238	167	71	0	0	0	0	0	0
Oct. 1937–April 1938	233	159	74	0	0	0	0	0	0
April 1938–Oct. 1938	237	146	91	0	0	0	0	0	0
Oct. 1938–March 1939	171	119	52	0	0	0	0	0	0

* Total rates after April, 1937, are omitted, and rates for males and females are computed for different periods because males were routinely X rayed in April and females in October.
† Rate per 1000 person-years.

tuberculosis in the same ward. No cases developed among those who had not been so exposed. The results are shown in the table.

The 25 new cases which developed represent a rate of 7·4 per 1000 person-years among inmates exposed to an infectious case of tuberculosis. The rate for males in this group was 8·1 per 1000 person-years and for females, 7·0. During the first fourteen months of observation, the rates were 14·0 and 7·2 for males and females, but for the last twelve months of observation these rates had decreased to 4·0 and 3·9. The more adequate facilities for isolation were obviously responsible for these decreases. The inmates not exposed to infectious cases were a smaller group and slightly younger. The largest group among both males and females was 10–14 years of age, with the group 15–19 next in size. If the rates for specific ages of the exposed group were applied to the unexposed group, the total number of expected cases would be 10—8 among males and 2 among females—and the incidence-rate for the group would be 6·9 per 1000 person-years. Actually, in this group no new case developed. The rate of change from negative to positive tuberculin reaction was nearly six times higher in the exposed group than in the non-exposed.

Under the conditions of this experiment so far as it has gone exogenous reinfection appears to be a factor of major importance in the high tuberculosis mortality of institutions. It has been shown by E. X. Mikol [1] that 11·7 per cent. of all deaths from pulmonary tuberculosis in upstate New York occur in state institutions. It seems probable that by adequate isolation of active cases this loss might be greatly diminished.

1. See *N.Y. St. J. Med.* Nov. 1, 1939, p. 2033.

IN ENGLAND NOW

A running commentary from our Peripatetic Correspondents

G.S.W. is on our hospital charts again, and to every doctor over forty these letters recall a nightmare of penetrating wounds of the chest and abdomen. The patients are fishermen from the North Sea, where mines had already added treachery to one of the most dangerous jobs. Every four hours the fishermen pull in their trawl, the bag is cut loose and hundreds of ice-cold fish slither into wooden troughs. The trawl is shot again and the crew gut the fish on the open deck before packing them in ice. At this time of the year ropes and wire-hawsers are frozen stiff and hail and seas may sweep over the bows of the lurching trawler. From the moment the ship starts trawling everyone on board works almost ceaselessly. Meals are often gulped and the only preparation for sleep is the throwing off of heavy sea-boots, while all the time the clang of bells or the rattle of winches goes on. When at last the ship turns to run for next morning's market there used to be sleep for some of the crew, but now even this rest may be broken. It is not surprising that accidents in this work are common and even in normal times every sixth patient in the local casualty ward is a fisherman. Crushing injuries to the chest, fractures, sea-boils and septic hands are often ignored by the sufferer or "cooked" by the skipper for days before a doctor sees them. To hospital come fishermen of many lands—Swedes, Germans, Norwegians and Dutchmen—distinguishable from our own men only by their language, their blond hair, wooden clogs or little gold earrings. None of these things hides the fact that all are men of the same brave living, with common interests and pleasure and sharing a heritage more real than flags or creeds or race. Till yesterday their only enemy was our scaur-wracked coast, but now at the quayside the old bitter enmity is smouldering again and machine-gun-bullet holes in hull and funnel are constant reminders. When the first ambulance arrived from port we knew that twenty years of progress had been undone.

* * *

Four o'clock tea in the medical school staff-room is one of the better institutions of a university. The clinician can put the laboratory worker in the witness-box and numerous experts can throw their spot-light of special knowledge on a particular problem. The gynæcologist in the flush of new victories can explain to the biochemist how easy and necessary it may be to estimate the gonadotrophic hormone in the cerebro-spinal fluid, or the bacteriologist may timidly hint to the surgeon that postoperative tetanus is not invariably caused by cat-gut. The critical audience of the tea-room is wide awake and you've got to be on your toes. Medical problems, however, do not fill the agenda, and golf and other academic interests sometimes creep in. To the younger men these tea-chats are an education, for everyone is on equal terms with the most senior senior. It is a pleasure, for example, to point out to a distinguished linksologist that a two at the long sixteenth is three under bogey when you know that your mild protest will be awarded full marks for intelligent interest.

Before the war when we were tired of listening or talking we could watch the little coasters and trawlers in the bay wearily pointing to sea. Now, however, thick curtains cut the view and talk is not entirely of choice for the war and politics are our daily bread. In some ways we have got to know each other better and the adolescent belief (not rare in Scotland), that a man who can localise to a millimetre a lesion on the lenticulo-rubro-spinal pathway is thereby competent to judge all human affairs has had a set-back. If you are young and read the *New Statesman* you may feel that an academic Jupiter who takes in the *Scotsman* needs careful watching when in the company of an earthy wench like politics. But these discussions have brought out a curious switch-over in the attitudes of the young and their seniors. Before the war emotional reactions to events came almost entirely from younger men while their seniors held a philosophic calm. The positions are now reversed, and some of the juniors are even mildly abashed at occasional aggressive outbursts while they pit what they believe is cold hard logic against the war experience of their elders. Another point of interest is the ease with which convictions may be quashed. There were those who had a brisk defensive reflex to the word Russia, and rightly or wrongly it was thought that this country might even have a little to learn from the medical and social achievements of the U.S.S.R. But since Finland was invaded these ideas have changed, and as medical men some of us have fallen into the error of assuming that because a patient has a brain tumour he must therefore have heart failure as well. The point is that at the end of the war we, and the trawlermen, will be expected to think clearly about our brave new world.

Apart from these changes of mood work goes on as usual, and the masons are still busy on the new ante-natal annexe. The real loss is radium, and skilful

block-dissections and amputations by courageous surgeons will not temper our welcome when it returns in the near future. Medical rounds for the staff are always a pleasure and the presence of specialists from a service hospital has made them better than ever. It is now hazardous, however, to deduce first principles from our four cases of myotonia atrophica, for after expressing appreciation the visitor may casually imply that they do not exactly fit the 53 patients he saw with the disease in the Seychelles. So far we have had no increase in the commoner organic diseases though elsewhere some speak of the incidence of perforated gastric ulcers having multiplied ten-fold. Nor have we had the expected outbreaks of epidemic illness with the arrival of city children in the country, though the epidemiologist might tell us not to speak too soon. But as the country is the only proper place to bring up children we feel that it is well worth the risk. The hue and cry of city boys and girls in a rick-yard makes us forget the psychological traumata to separated parent and child, and even the most sensitive youngster will take back something worth while from a sheep-farm on the hills to the Gorbals of Glasgow. Our medical refugees have lost much more than we can possibly give them. That they can work again is something, and they may have found brief pleasure in our *Weihnachtsfeier*, but even the thousand miles inland trek of Chinese students was to a new home in their own country. Our London visitors have left to spend Christmas in the security and civilisation of their homes. The happiest exiles are the fieldfares which find more food in our farmlands than in the arctic frosts of Scandinavia.

* * *

I and some of my students were having an informal chat after the day's work. Various stories were told of German students encountered before the war at the university or elsewhere, from full-blooded Nazis to driven-out refugees; all of them illustrating either the hypnotised loyalty of young Nazis to their Führer or the fear, even in another country, to say directly what one thinks. "What strikes me most about England," said one young German refugee, "is its peace; everybody seems to be able to do and think and say what they want to, without any revolvers in the background. But," he went on, looking rather scared at having said so much, "for us it is different. Hitler is right." We all agreed that here was a form of neurosis, an abdication of the human mind and spirit when confronted with a situation too difficult for individuals without the strength and courage to "make their peace with events."

It is hard for one generation to understand another, and so I asked them, "What of our own young people? Do you feel insecure, as if the world was tottering about your heads?" "We are not a good criterion," was the answer; "we medical students know that we are certain of work to do, work that is worth while and will give us a living at least. But it is very different in other faculties—there, students can hardly remember a time when they were not pressed upon by the insecurity of the future." "Yes," interposed another, "that is why there is so much atheism about—they have no faith in anything." I thought of those words of Isaiah, which might be prefaced by the title "Totalitarians." (The translation differs a little from the traditional one)

Behold, God doth take away from the people the pillars of society—the leader, the warrior, the judge, the prophet, the seer and the grand old men, the official, the counsellor and those held in honour. I will make young upstarts to be their leaders, and inexperienced youngsters shall be in control; the people shall be oppressed, one man by another and every one by his neighbour. The young will have no respect for age, nor the vulgar for distinction.

This was a warning to Isaiah's own people, but it applies more appositely to other, more obvious nations.

* * *

It has been a happy Christmas in hospital. The traditional elaborate schemes of ward decoration are missing this year; sisters and nurses have, therefore, not tired themselves out competing in ingenuity with other wards. Everything has been more homely and sincere, and certainly the patients in my own wards have felt more part of the family and not mere spectators in a show which might even attain the glory of a press photograph, complete with the chairman and matron in the foreground. In my men's ward we were a nicely assorted bag: some bedridden, some up and convalescent, and half a dozen naval ratings. The senior and junior honoraries and their wives came in on Christmas morning to wish everybody a happy Christmas—"doing their stuff" was the term given by an irreverent houseman. A few minutes before noon sister robed the senior honorary in a beribboned carving apron, the usual jokes were exchanged about the competence of a physician to carve a turkey without mutilation ("Shall we send for a surgeon?"), and then the turkey was brought in as triumphantly as any boar's head of ancient times. The carving done, sister complimented the chief on his skill ("All carved by ten minutes past twelve, sir!"), and there was a pause while the men got down to their trenchers. Then the Christmas pudding appeared, its inserted fusees scattering sparks (brandy is too expensive just now), and the Navy led the way in sinking it completely after a short, sharp engagement. Mr. Smith (probably a famous performer at his church debating society) then rose to make his little speech, and finally sat down, red-faced but happy. There were cheers for the honoraries, crackers were pulled and paper caps made the patients feel more daring. Even old B——, who is slowly dying in bed 7, had a taste of minced turkey and smiled happily now and then.

* * *

Yesterday I came across some notes written in October, 1914. Apparently I set out to jot down ideas as they came so that they could be worked up into a paper twenty-five years later with the help of the official records. Like all my best resolutions this one petered out pretty soon, but the following seem worthy of the light of day.

Surgeons are now learning something about gunshot wounds for the first time since the South African war. But the accidents happening in London from the darkening of the streets are the same as occur in peace time. Three things have struck me that the war has already brought out.

1. That the strong German influence on medicine is bound to lessen during the ensuing years with a corresponding increase of French influence.

2. How remarkably well many people are getting on without going to see doctors and especially without going to see specialists and particularly surgeons at that.

3. That the importance of insects in the spread of disease is now forcing itself on the profession in a way that in peace-time would have taken years to effect.

Since the war began surgical practice seems to have dwindled almost to nothing. The younger men are hardly doing anything, the big men only about half—I believe—of what they were before. The physicians are less hardly hit, but are certainly feeling it. Even

in general practice among the wealthier parts of the population there is far less to be done. In the poorer parts I do not know quite what is happening, but they are certainly not busier than they were before. Before the war we all thought that sickness among the civil population would increase, but that was based upon ideas of shortage of supplies and increase of food prices, with a corresponding increase in destitution and epidemics. These things may come later, but in the meantime it is clear that there are many people doing without doctors who would have gone to them if their thoughts had not been distracted to other things. This should make us realise that many can get on very well without us, and make us chary of treatment approaching the heroic. I take it that people who have a buzzing in the ears settle down to read the *Times* or *Daily Mail* and forget their buzzing instead of coming to someone to have their ears blown up, or if the airway through one side of the nose is not clear they settle down to make pyjamas for the soldiers in the trenches instead of going from one nose specialist to another until one operates upon their septum. After the war they will come back to us (or it will be a bad thing for me)—but in the meantime it is one up to the Christian Scientists and the faith-healers—if only they knew it.

Might have been written yesterday, mightn't it?

PUBLIC HEALTH

Control of Puerperal Sepsis

THE Ministry of Health has issued a memorandum [1] on the control of puerperal sepsis, which is presumably meant to supplement—and in certain points to correct—a circular letter of March 30, 1938, on the same subject. The object of the memorandum is "to explain the nature of puerperal sepsis, how it is spread, and how to identify and group the streptococci responsible." In actual fact, little is said about the nature of puerperal sepsis, and the pamphlet deals only with infections due to the hæmolytic streptococcus, which accounts for less than half of all notifiable cases of puerperal pyrexia. In this field, it states that knowledge of the nature and sources of puerperal infection "is not being applied in maternity institutions and in domiciliary practice with the promptitude and purpose required to prevent the spread of infection." This stricture on maternity institutions must apply more particularly to small maternity homes, for that most of the larger maternity hospitals and units in general hospitals have already put their houses in order is obvious to anyone acquainted with them, and is reflected in their low morbidity-rates. The position in regard to domiciliary practice is of necessity less satisfactory, and the Ministry's memorandum serves a useful purpose in giving definite advice about procedure in circumstances where in the past uncertainty has often prevailed.

This advice is based on the knowledge that streptococcal puerperal infections are for the most part caused by the same hæmolytic streptococci (*Streptococcus pyogenes* or group A Lancefield) as are responsible for scarlet fever, tonsillitis, sinusitis and the like, and that the natural habitat of these streptococci is the human upper respiratory tract. The preventive measures to be adopted are considered from two standpoints. (1) In the absence of puerperal pyrexia, routine swabbing of midwives is not recommended. Instead, a careful clinical—and presumably bacteriological—examination should be made of candidates for training as pupil midwives, so that those suffering from chronic streptococcal infection of tonsils or sinuses may be warned that the persistence of such a disability is likely to prevent them from becoming practising midwives. The midwife should be instructed to report immediately any infection of the upper air passages and be forthwith suspended from duty until a bacteriological examination has been made. If group A streptococci are found she must not resume duty "until she has recovered completely and three negative swabs at daily intervals have been obtained." Here begin the M.O.H.'s difficulties. When, where, and by whom is swabbing to be done? Are daily preferable to twice-weekly swabs, and are not two negatives enough? And what is to be done with the midwife who continues to give positive swabs although clinically well? (2) On the occurrence of puerperal pyrexia, it is recommended that "until the existence of infection of the genital passages with hæmolytic streptococci has been excluded, the attendant contacts must not conduct a labour or nurse any other puerperal woman." This is drastic advice, even although the natural corollary that the bacteriological examination of a vaginal swab must be made in every case of puerperal pyrexia is qualified by "unless the practitioner can be quite certain that the fever is not due to infection of the genital tract." Surely a distinction should be made here between institutional and domiciliary midwifery. The practitioner and the midwife meet many instances of puerperal pyrexia which, they are pretty certain, are not due to genital-tract infection. Must these cases be immediately swabbed, and if the swabs have to be sent to the laboratory by post, is the doctor or midwife to be entirely precluded for at least two days from attending any parturient or puerperal woman? Are swabs to be taken from all the considerable number of patients with postabortal pyrexia among whom group A streptococcal infections are rather rare? If the vaginal swab yields hæmolytic streptococci, search for a possible source of infection should be confined to contacts who might in the course of their duties carry infection to other parturient women—i.e., primarily doctors and midwives. This is reasonable, although it would be a satisfaction to the midwife in domiciliary practice if the search for the "criminal" were extended to the patient herself and to any other suspect member of the household. And let it be stressed, in these days when administrators are become Lancefield-conscious, that the finding of group A streptococci in the throat of a contact does not prove that individual to be the source of infection unless his (or her) streptococcus has been shown to be of the same serological *type* as the infecting strain.

The latter part of the memorandum deals with the laboratory methods required for the isolation and identification of the hæmolytic streptococcus together with an evaluation of the findings. Lancefield grouping can be done in 48 hours—Fuller's [2] formamide technique has advantages over the acid-extraction method recommended in the memo.—and is within the scope of any up-to-date laboratory, since grouping sera are now available commercially. Identification of the serological type is still a specialised research which is practised in only a few laboratories, and primarily and principally in the Ministry's own pathological department. Medical officers of health are

1. Memo. 226 Med. H.M. Stationery Office. 2*d*.

2. Fuller, A. T., *Brit. J. exp. Path.* 1938, **19**, 130.

reminded that the Emergency Public Health Laboratory Service is available for the examination of swabs from "evacuated" maternity patients.

Finance of the Emergency Hospital Scheme

The Ministry of Health has sent circulars this week to the hospitals and other institutions included in the emergency scheme, and to local authorities, clarifying the financial provision under the scheme and making certain changes. The circulars again set out the categories of patients for the cost of whose treatment and maintenance the Treasury will be responsible. Service patients now include women members of the fighting services, Army, Navy and Air Force Nursing Services, and the voluntary-aid detachments. Certain officers on half-pay, soldiers' families and others are also included. Hospitals receiving ordinary civilian patients transferred under the scheme must obtain a contribution from them towards the cost of treatment. The Hospital Saving Association and other contributory schemes have agreed as to the payments they will make to hospitals for these patients. No contribution will be collected from unaccompanied evacuated children admitted to hospital since their parents will be expected to continue payment towards the cost of billeting. The Ministry will pay the railway fare home of discharged patients who live more than 15 miles from hospital where the cost might involve serious hardship. In the same way it will where necessary contribute towards the expenses of relatives visiting patients who are dangerously ill.

The cost of board and lodging for medical students attached to hospitals for the purpose of assisting in the emergency scheme has hitherto been the responsibility of the Minister. He has now come to the conclusion, however, that he is not justified in regarding the assistance of medical students as necessary to the scheme, and will cease to pay for their board and lodging after Jan. 1. He will allow the present billeting arrangements to stand, so that students attached for teaching purposes to institutions other than their usual teaching hospitals may still be billeted by the local authority's billeting officer, and billeting householders will still be paid through the Post Office at the rate of 5*s*. a week for lodging only and a guinea for board and lodging. Students may also still be accommodated in the outer hospitals themselves. But in both cases the students will now have to repay the cost of accommodation. If the situation alters so that students are wanted to help with the treatment of actual casualties the arrangements for recovering the cost of their keep will be suspended during the period in which they are employed.

Sulphonamides showing in the Audit

Since the introduction of sulphanilamide and its relatives the case-mortality of puerperal sepsis has fallen everywhere, but it cannot yet be said definitely how far this is cause and effect. The significance of the recorded rise in the incidence of the puerperal fevers since 1927 is also doubtful, since before the Puerperal Pyrexia Order of 1927 the figures for incidence and mortality were untrustworthy. In his report on the health of Newcastle-upon-Tyne for 1938 Dr. J. A. Charles attributes the improvement in the maternal mortality-rate to 3·3 per thousand to the effect of chemotherapy in streptococcal infections. His general statistical table for the years 1885–1938 showed that until 1929 the recorded fatality-rate from puerperal sepsis only five times exceeded 1 per thousand live births, and in thirteen years it was below 0·5. From 1929 onwards the mortality from this cause apparently increased greatly, and the rate did not again fall to 1 per thousand until 1937. In 1938 it was 1·03. In Cambridgeshire, with 1872 births, there were no deaths at all from puerperal sepsis in 1938, and Dr. R. French has no hesitation in ascribing this success to chemotherapy.

In erysipelas, on the other hand, the benefits of the sulphonamides are easier to assess. In Newcastle the incidence has varied little in the forty years in which it has been notifiable, and its case-fatality rate has also been constant over grouped periods except for an increase in 1927–37, when it averaged 6 per cent. In 1938, with the use of the sulphonamides, the case-fatality rate dropped to 0·5 per cent. Dr Dawson-Walker, medical superintendent of the city infectious diseases hospital, says: "In no other conditions are the results of their administration so consistently effective as in erysipelas, and all the previous forms of treatment have been superseded." Erysipelas is an invasive streptococcal infection, and is little influenced by serum, but figures from all over the world record the same striking collapse in the mortality with chemotherapy. The rate is now probably approaching an irreducible minimum.

Dr. Dawson-Walker says that in scarlet fever sulphanilamide is useless—it neither reduces the toxæmia nor prevents complications. This is the general experience in isolation hospitals. Scarlet fever is now mostly a mild streptococcal toxæmia which yields immediately to serum. The toxic form, clinically resembling heliotrope influenza, which used to be fairly common and invariably fatal, is now rare and curable with serum; whether chemotherapy will affect septic scarlet fever remains to be seen, for there has so far been little opportunity to try it. Simple and toxic scarlet fevers are toxæmias without invasion; septic scarlet fever, like erysipelas, is an invasive infection. It seems that the sulphonamides are powerful in streptococcal invasion but useless in streptococcal toxæmia. It is surprising that they are ineffective in preventing the complications of scarlet fever, but experience in the treatment of gonorrhœa suggests that they do not act until reaction has started. Some streptococcal puerperal fevers are toxæmic, like scarlet fever, while the majority are invasive, like erysipelas. Natural mortality is low in the former and high in the latter. We should expect sulphanilamide to give dramatic results in the invasive fevers—septicæmia, perimetritis, parametritis and so on—and there is a general impression that it does, though we cannot yet be as dogmatic about it as about erysipelas.

School Health Services

As we have already noted (Dec. 23, p. 1323), circular 1490 of the Board of Education stated in impressive terms the extent to which the school health services, built up with so much labour during the last 30 years, have been undermined by the impact of war. While some local education authorities have made a determined effort to surmount the difficulties of evacuation, in other areas, especially those which seemed likely to be the first targets of the expected *Blitzkrieg*, the authority, or some dominant personality amongst its officers, seems to have said of air-raid precautions "This one thing I do," and to have allowed the premises formerly used by the school medical services, such as school clinics, treatment centres and feeding centres, to be allocated to other purposes, with the result that those services practically ceased to function. At the beginning of the war this concentration on civil defence was in such areas inevitable, but the time has now come when

staff and premises should, as far as possible, be restored to the school health services, subject to their being made immediately available for casualties if the tragic occasion arises. Whilst the reception areas were, at the outset, necessarily the Board's first preoccupation, their attention is now largely focused on the evacuation areas where the difficulties in restoring the service to normal are greatest. In these, many schools are still closed pending the provision of protection, or still in occupation for other purposes. Moreover, when it becomes possible to resume schooling the Government has decided that attendance cannot be made compulsory. Some of the children in the evacuation areas who have returned home have had some schooling in the reception areas, and have received a good deal of medical and nursing attention. But at least half of the children in most of the evacuation areas have run wild since the end of July.

Happily, as regards infectious diseases, the autumn term has been most providentially blessed; their incidence has been in most cases below that of the normal expectation, and far better than the preceding year. But, as regards cleanliness and discipline, deterioration is obvious. In some cases there will be accommodation only for the senior children; and, as attendance will not be compulsory, many of those children most in need of attention will not receive it. The circular suggests that the cleansing stations provided for air-raid precaution purposes should be utilised for the cleaning up and treatment of school-children—a proposal which has been welcomed by the Minister of Home Security. The admirable shower baths and the arrangements for rapid transit at these stations should enable a constant stream of children to be inspected for uncleanliness and skin diseases and, where necessary, cleansed and treated. By the end of three months all the children will have been inspected and treated.

Antedating the war by some two years a gradual increase in scabies has been noticed in many parts of the country, and it is to be feared that war conditions may have produced some further increase in this disease. As regards pediculosis the condition of some of the evacuated children at the end of the summer holidays should be a warning that the condition of the non-evacuated children after nearly six months may well call for some thorough and intensive attention.

TAVISTOCK CLINIC.—A postgraduate course of weekly lectures in psychopathology and psychotherapy will begin at this clinic on Monday, Jan. 8. The subject of the lectures will be announced in our Medical Diary, and further particulars may be had from the educational secretary of the clinic, which has found a temporary home at Westfield College, Kidderpore Avenue, London, N.W.3.

SCHOOL HEALTH SERVICES IN SCOTLAND.—A memorandum issued to Scottish education authorities points out that the school health services which have been built up with so much labour during the last 30 years must not be allowed to deteriorate because of the stress of war. Measures of reorganisation are urgent in order that health services may be adapted to new conditions. Every authority is advised to endeavour to secure a school health staff equal to the needs of the local situation by augmenting the ordinary staff. This may in some instances be possible by obtaining the services of doctors and nurses attached to first-aid posts, but where such are not available new appointments may be necessary. On the subject of nutrition the memorandum reiterates the view of the value of a good mid-day meal. It is hoped that authorities will make provision to recommence mid-day meals in schools and to return to the provision of milk in schools at the earliest possible moment.

Obituary

EDWARD SABINE TAIT

M.D. LOND.

Dr. Tait, who died in London on Dec. 14, qualified from St. Bartholomew's Hospital in 1879, taking a university degree with honours two years later and becoming M.D. in 1888. Before entering on general practice he was house-surgeon at Bart's and held resident appointments at the General Lying-In Hospital and St. Luke's Hospital for Lunatics. W. L. B. writes: "By the passing of Dr. E. S. Tait at the ripe age of 83 a link with the past is broken, for his father and brother were both Bart's men; but happily the tradition goes on, for two of his nephews are members of that hospital. Edward Tait practised all his life in Highbury where his home and the charming garden created by his wife are remindful of the dignified past of that neighbourhood. He was something more than a good physician; surprisingly modern in outlook and infinitely painstaking, his approach was that of the fine courtesy natural to him. To consult with him was to witness that relationship between doctor and patient which must abide if the art of medicine is to continue. Tait was a connoisseur and delighted in the arts, himself a sculptor of no mean talent in whose delicately perceptive work was made plain his great love of beauty and respect for craftsmanship. He made an admirable collection of etchings, among them some fine examples of the French, English and Swedish masters. He will be greatly missed, for he had a personality—rare in these turbulent days—which endeared him to all who knew him."

JOHN STEDWELL STANSFELD

M.A. OXFD, M.R.C.S.

THE memory of John Stansfeld, who has died at the age of 86, is kept green by the medical mission in Bermondsey which he founded. His approach to medicine was not through the usual channels. A Londoner by birth and education, he tried various occupations, including engineering, until at 22 he entered the civil service and was appointed to the inland revenue at Horncastle, Lincs. Here he formed a friendship with Henry Lunn, who was already at 18 showing great business ability inside his Methodist home. The influence of Stansfeld sent Lunn to Dublin to train for medical missions. Stansfeld himself was transferred to Oxford where while still a civil servant he took a degree from Exeter College and a theological course at Wycliffe Hall, and began to study medicine. He was sent to Glasgow and continued his medical studies at the infirmary there for three years. A removal to London led to the completion of his medical course at Charing Cross Hospital, during which he worked in Bermondsey. This was in 1897 when he was already 42. For the next eight years while still keeping his civil-service appointment, he remained in charge of the Oxford and Bermondsey Mission which was constantly adding to its branches and clubs. In 1910 Stansfeld was ordained and became rector of St. Ebbe's in the poorer part of Oxford, where he opened a dispensary. He also built a convalescent home on Headington Hill just outside Oxford. Late in life he went out as a medical missionary in Central Africa till ill-health compelled his return home. At the time of his death he was rector of Spelsbury in the Cotswold country.

LETTERS TO THE EDITOR

UNEXPLORED SOURCES OF VITAMINS

SIR,—In the annotation in your issue of Dec. 16 you show that the rachitic action of cereals is to be overcome by the addition of calcium to the diet—e.g., milk. It is difficult to see how this applies to West Africa, where calcium is deficient in the normal dietary and an excess of cereal or tuber foods is taken, and yet rickets appears to be singularly rare. The dietaries obtain their main mineral sources from the leaf, fruits and vegetables, but these may be greatly reduced at certain seasons or in time of poverty. McCullough views the late weaning of infants as indicative of this shortage of minerals, and Leitch refers to the use of the oyster shell in the Gambia and of edible earths in Nigeria as further evidence. There is some suggestive evidence also that phosphorus may be deficient in West Africa owing to the shortage of animal and fish protein and oils, as well as a possible shortage in the soil itself. There is little evidence of rickets among these peoples, though the disease is apparently excessively common among the African-Americans of the United States.

West African diets vary in their staples, and in most milk is not drunk at all. Rice is the staple for Sierra Leone, maize for the Gold Coast, yam for one part of S. Nigeria and manioc for another, and cocoyam for the Cameroons. There are also the millet- and guineacorn-eating areas, but the natives of these are milk drinkers as well. These various peoples and tribes would offer interesting comparative material in that respect alone. It is interesting to note, for instance, the outstanding physique of the yam-eating Ibos in comparison with their manioc-eating neighbours, but this has never been investigated. There is some evidence of increased fragility of bones. But it all awaits, locally at least, much more definition.

West Africa offers exceptional opportunity for research, in which she has been sadly lacking in the past. What little reference to be found to rickets is itself conflicting. Some claim for its presence has been made in Sierra Leone, and of the absence of vitamin D in the Gambia, both apparently on the assumption that the pigmented skin of the African will not permit irradiation by the sun's rays; but this is refuted by McCullough (Nigeria), who states he has seen practically no evidence of rickets and would not expect to find it. He quotes the work of Steenbock and others in support of his views.

West Africa must be one of the few countries which, though possessing low standards of living and a heavy toll of malnutrition, yet has an abundance of vitamins A and D. Red palm-oil (made from the outer husk of the palm nut) is one of the richest of the few *vegetable* oil sources of vitamin A; it is cheap, and much liked by many Europeans, being known familiarly in palm-oil chop. It is known in this country for its soap-making qualities! In America its value as a highly vitaminised nutritive oil is recognised by Sure and many others in the manufacture of margarine. Here at home, especially during wartime, our public is being familiarised with the value of vitamin-bearing foods such as cod-liver oil and halibut oil. Commerce tells us now of the value of the avocado pear. We are learning the values of silo-prepared hay and of stored dried grasses in their relation to cattle fodder and butter. Little has been done to introduce red-palm oil to countries where deficiency of vitamin A is causing such conditions as xerophthalmia and which may be too poor to buy the expensive fish oils.

After the war West Africa may become a valuable field for nutritional research.

I am, Sir, yours faithfully,

Parkstone, Dorset. D. FITZGERALD MOORE.

SAFETY FIRST

SIR,—In view of the absorption of great numbers of medical practitioners into whole- or part-time service in one or other of the fighting or defence forces of the Crown, and the consequent dislocation of medical practice throughout the country, it is thought advisable to point out the vital necessity for ensuring personal legal protection. It would be folly to assume that because of employment in the Naval, Military or Air Forces a medical practitioner's immunity from legal attack was assured. Experience has shown that such attacks may mature at an interval of months, if not years, after the alleged negligence or malpraxis has occurred. It is unfortunately established beyond any doubt that at all times and under all circumstances every medical practitioner in the practice of his profession is liable to legal attack, and that he may require legal protection even against the authority by whom he is employed.

The undersigned representatives of the two leading defence organisations consequently feel it appropriate to urge strongly the necessity for every medical practitioner to belong to a defence society. Those who are already members should continue to pay their subscription—the saving of this small annual outlay in no way compensates for the liability which may be incurred—while those who are at present unprotected should join a society without delay.

To facilitate matters, arrangements have been made with the societies' bankers for the completion of bankers' orders which ensure that no matter what circumstances may arise the member will not be penalised through some hindrance in the payment of his subscription by the proper date.

We are, Sir, yours faithfully,

ERIC PEARCE GOULD,
President, The Medical Defence Union.

CUTHBERT WALLACE,
President, The London & Counties Medical Protection Society.

ELECTROSURGICAL OPERATIONS IN GALL-BLADDER DISEASES

SIR,—Prof. B. O. Pribram's article in THE LANCET of Oct. 28 repeats certain statements that I have already challenged. He says that I adopted his method in 1933: whereas the facts are that I discarded his method in 1933 and elaborated a method different in principle and in execution from the procedure he describes as "mucoclasis." These facts are substantiated, with references, in THE LANCET, 1938, **1**, 15 and 1186, and **2**, 283.

I am, Sir, yours faithfully,

MAX THOREK,
Professor of Surgery, Cook County Graduate School of Medicine.

Chicago, Illinois, U.S.A.

*** We have submitted this letter to Professor Pribram, who writes: "I, too, am content to refer your readers to the correspondence cited and especially to pp. 254–262 of 'Clinical Electro-Surgery,' by G. Blech of Chicago (Oxford University Press, 1938)." —ED. L.

SACCHARIN TO THE RESCUE

SIR,—From Jan. 8 we must limit our intake of sugar as such to three-quarters of a pound a week, though we may still buy sweets or jam ad libitum. As a source of energy its place can largely be taken by other carbohydrates, but most sugar is eaten as a condiment and not as a food at all. There are about 120 lumps in the average pound of cube sugar, so that the man who takes two lumps in each of four cups of tea daily will be using in this way 56 lumps or about half a pound of sugar a week. There will be little of his ration left for other purposes. If this use of sugar could be removed not only would the problem of the individual consumer with a sweet tooth be solved, but the Minister of Food might realise his dream of reducing the national consumption of sugar to what can be extracted from home-grown beet. Theoretically nothing should be easier than for tea-drinkers to change over from sugar to saccharin and in dilute solution the taste of the two is indistinguishable. Expense need not stand in the way. Tablets containing gr. 1/3 of saccharin, each equal in sweetening power to a lump of sugar, cost about 3*s.* 6*d.* for 500 tablets at a retail chemist. Thus the equivalent of a pound of lump sugar at 5*d.* costs about 10*d.*—not a prohibitive difference. Moreover, saccharin is one of the by-products of the gas-works, and its price has hitherto been based on a comparatively small demand. The supply could be increased without difficulty even to the degree necessary to supply all the tea-drinkers of the country, and the price could then presumably be greatly reduced. Some difficulty might, however, be encountered in persuading our conservative people to change the habits of a lifetime.

The high concentration of saccharin also has its disadvantages: it is not easy to sprinkle a third of a grain of powder on a plate of porridge, or to mix ten grains into a cake. Some way of adding bulk is required. The simplest way of overcoming both these difficulties seems to be to add saccharin to sugar itself in the process of manufacture. If 30 grains of saccharin were dissolved in each pound of sugar its sweetening power would roughly be doubled and our three-quarters of a pound ration would go twice as far. Pharmacologically saccharin is inert, so this supercharged sugar would be harmless, but there would be need for inquiry into its ability to withstand the chemical and physical shocks to which sugar is exposed in the kitchen.

I am, Sir, yours faithfully,

GLYCOPHIL.

THE WRITING ON THE WALL

SIR,—I wish to add to your collection of *graffiti* the following specimen, which is one of the oldest philosophical aphorisms of the Greeks:—

πάντα ῥεῖ· οὐδὲν μένει.

I am, Sir, yours faithfully,

DR. PANGLOSS.

MEDICAL NEWS

University of Cambridge

At the final examinations for M.B., B.Chir., the following were successful:

Part II (*Physic, Pathology and Pharmacology*)—J. B. Bramwell, B. N. Brooke, M. M. Bull, K. P. S. Caldwell, H. D. L. Campion, B. E. Camus, J. A. Cosh, K. M. Cossens, R. Crawford, P. J. Crowley, P. J. R. Davis, H. P. Dick, N. B. Eastwood, J. Evans, W. J. G. Evans, I. S. Eve, P. G. H. Gell, E. S. Goller, G. D. Graham, M. J. Greenberg, B. G. Gretton-Watson, L. N. Grunbaum, B. L. F. Heydon, P. G. Holman, A. C. C. Hughes, J. F. K. Hutton, G. H. P. John, T. E. Jones-Davies, R. D. Kennedy, G. O. M. Neatby, P. E. Perceval, T. J. A. Phillips, M. R. Pollock, R. Rowlandson, I. F. Smith, A. M. Stevens, T. L. Stoate, A. C. Thackray, C. C. Thomas, H. D. S. Vellacott, C. H. F. Wood, R. J. T. Woodland and R. Wright.

Dr. G. S. Graham-Smith, F.R.S., Dr. E. B. Verney, F.R.S., and Mr. W. H. Bowen have been appointed members of the M.D. Committee for 1940.

At recent examinations the following were successful:

D.M.R.E.

Part I.—R. A. D. J. Bernhardt, J. O. Y. Cole, J. L. Freer, C. W. C. Gough, J. J. Hurley, John Innes, R. I. Lewis, E. B. P. Madden, Siri Mahananda, James Malin, H. S. Murray, J. O. Sallk, D. M. Scrimgeour, and Joseph Walter.

Naval Honours and Promotions

The O.B.E. (military division) has been awarded to Surgeon Commander M. A. Graham-Yooll, R.N. (H.M.S. *Adventure*), and Surgeon Lieutenant H. G. Silvester, R.N. (H.M.S. *Jersey*) for "undaunted courage, steadfastness, coolness and resource in saving ships and life at sea in the face of peril and adversity." The D.S.C. has been awarded to Surgeon Lieutenant V. J. R. Sheridan, R.N., for services in the Sino-Japanese conflict.

The following promotions are also announced:

Surgeon Commander to Surgeon Captain—M. B. Macleod, R.N. (*Raleigh*); R. A. W. Ford, R.N. (H.M. Dockyard, Sheerness); C. H. M. Gimlette, R.N. (M.D.G. department).

Surgeon Lieutenant-Commander to Surgeon Commander—D. C. Eglington, L.D.S., R.N. (*Collingwood*); R. R. B. Roberts, R.N.V.R. (H.M. Infirmary, Deal); J. A. Kerr, R.N.V.R. (*Lochinvar*), and G. R. D. Hankinson, L.D.S., R.N.V.R. (*Defiance*).

University of Wales

Dr. D. T. Thomas has passed in part I of the D.P.H. examination.

War Posts for Women

The following women doctors have been appointed to the R.A.M.C. as medical officers with the relative rank of lieutenant: Dr. Agnes Black, Dr. Muriel Boycott, Dr. Anna Glover, Dr. Hilary Hadaway, Dr. Fanny Pollecoff, Dr. Doris Small, and Dr. Ethel Whitby.

Miss Caroline Elliott has been appointed consultant obstetrician to Perthshire for war, and hon. obstetrician to the Perth Royal Infirmary; Dame Louis McIlroy, consulting obstetrician to Buckinghamshire for war; Miss Margaret Salmon medical officer in charge, and Dr. Betty Walker assistant medical officer at the Emergency Maternity Hospital, Cooden, Kent; and Dr. Edith Gould civilian medical practitioner to the Families Hospital, Shorncliffe.

Civil Nursing Reserve

Last week under this heading we noted the appointment of eleven nurse officials to undertake the reorganisation of the reserve. The announcement of these appointments was made at a meeting of the council of the Royal College of Nursing and not at a meeting of the General Nursing Council as we stated.

Pharmaceutical Society of Great Britain

On Tuesday, Jan. 9, at 7.30 P.M., Mr. A. D. Powell, A.I.C., will deliver the Harrison lecture on Drug Standards: their development and application. The Harrison medal will be presented to Mr. Powell during the evening.

Sir Ernest Graham-Little, M.P., has been re-elected chairman of the council for external students of London University for the year 1939–40.

Mr. Herbert John Seddon, F.R.C.S., has been appointed to the Nuffield professorship of orthopædic surgery in the University of Oxford.

Medical Diary

Week beginning Jan. 8

ROYAL SOCIETY OF MEDICINE, 1, WIMPOLE STREET, W.1.

TUESDAY

Psychiatry, 2.15 P.M., Dr. F. Golla, Mr. W. Grey Walter and Dr. G. W. T. H. Fleming: Electrically induced Convulsions. Dr. W. H. Shepley and Dr. J. S. McGregor: The Clinical Applications of Electrically Induced Convulsions.

WEDNESDAY

History of Medicine, 2.30 P.M., Dr. H. P. Bayon: Trotula and the Ladies of Salerno.

PADDINGTON MEDICAL SOCIETY.

TUESDAY—2.30 P.M. (St. Mary's Hospital, W.2), Dr. Sinclair Loutit and Dr. G. B. Shirlaw: What is the Scope and Utility of First Aid and First-aid Posts on the Home Front?

SOUTH-WEST LONDON MEDICAL SOCIETY.

WEDNESDAY—3 P.M. (Bolingbroke Hospital, S.W.11), Prof. Alexander Fleming: Some Aspects of Vaccine Therapy.

BRITISH POSTGRADUATE MEDICAL SCHOOL, DUCANE ROAD, W.12.

TUESDAY

2.30 P.M., Lord Horder: Ward clinic.

WEDNESDAY

11.30 A.M., clinico-pathological conference (medical). 2 P.M., Mr. E. J. King, Ph.D.: Gastric Function. 3 P.M., Clinico-pathological conference (surgical).

THURSDAY

2 P.M., Dr. Duncan White: Radiological conference.

FRIDAY

2 P.M., Clinico-pathological conference (gynæcological).

DAILY

10 A.M.–4 P.M., Medical clinics; surgical clinics and operations; obstetrical and gynæcological clinics and operations. 1.30–2 P.M., postmortem demonstration.

TAVISTOCK CLINIC, WESTFIELD COLLEGE, KIDDERPORE AVENUE, N.W.3.

MONDAY—3 P.M., Dr. E. B. Strauss: Mental Mechanisms.

FELLOWSHIP OF MEDICINE AND POSTGRADUATE MEDICAL ASSOCIATION, 1, Wimpole Street, W.1.

MONDAY to SATURDAY—St. Mary's Hospital, W.2, Tues., Wed., and Thurs., 8 P.M., F.R.C.S. (Final) course. Royal Cancer Hospital, Fulham Road, S.W.3, daily 9.30 A.M., F.R.C.S. course.—Mon. (afternoon and evening), Thurs. and Fri. (afternoon), operative surgery course. Royal National Orthopædic Hospital, Brockley Hill, Stanmore, Middlx., Fri., 2 P.M., orthopædic course. Medical Society of London, 11, Chandos Street, W.1, Tues., 4.30 P.M., Mr. C. E. Shattock: Neck; Thurs., 4.30 P.M., Mr. J. Swift Joly: Kidneys.

Births, Marriages and Deaths

BIRTHS

FOX.—On Dec. 28, at Greenhouse, Rotherfield, Sussex, the wife of Lieut. T. F. Fox, R.A.M.C.—a son.

HAMILTON.—On Jan. 1, in Edinburgh, the wife of Dr. J. M. G. Hamilton—a daughter.

HARTLEY.—On Dec. 31, at North Lea, Henley-on-Thames, the wife of A. E. M. Hartley, R.A.M.C.—a son.

MARRIAGES

TULLOCH—VERITY.—On Dec. 30, 1939, at All Souls, Langham Place, W., William Selby Tulloch, M.B., to Nina Verity.

DEATHS

ADAMS.—On Dec. 31, at Cheltenham, Major Herbert Frederick Wilfrid Adams, M.B. Edin., D.P.H., R.A.M.C., aged 51.

ATKINSON.—On Dec. 27, in London, James Atkinson, M.B. Edin., of 31, Wimpole Street.

DRAKE.—On Friday, Dec. 22, at Marseilles, Dennys John Drake, M.R.C.S., of Gillingham, Kent.

ELDER.—On Oct. 29, at New York, Douglas Elder, M.B. Lpool.

MACPHERSON.—On Dec. 29, at Bournemouth, James Fraser Macpherson, M.B. Edin., in his 76th year.

MARTIN.—On Dec. 30, at Cheltenham, John Middleton Martin, M.D. Camb., D.P.H.

PADDON.—On Dec. 24 in America, Henry Locke Paddon, M.A. Oxfd, M.R.C.S., of the International Grenfell Association, aged 58.

RENNIE.—On Jan. 1, at Torryburn, Kintore, Alexander Rennie, M.A., M.B. Aberd., D.P.H.

RYAN.—On Dec. 25, in London, William Arthur Ryan, L.R.C.P.I.

STEPHEN.—On Jan. 1, at Aberdeen, James Alexander Stephen, M.B. Aberd., D.P.H., of Morayfield, Cults.

Appointments

HOLLIDAY, MARGARET, F.R.C.S.I., L.M., D.T.M. & H., resident medical officer at the Maternity Hospital for the wives of officers in the Royal Navy, Army and Royal Air Force, Fulmer Chase, Fulmer, nr. Slough, Bucks.

SCHOFIELD, J. W., M.R.C.S., L.D.S., hon. assistant dental surgeon to the Middlesex Hospital, London.

WALKER, D. G., M.B. Dubl., M.Dent.Sc., hon. assistant dental surgeon to the Middlesex Hospital, London.

Vacancies

Bath, Royal National Hosp. for Rheumatic Diseases.—Res. M.O., £150.

Birkenhead County Borough.—Asst. school M.O. and asst. M.O.H., £500.

Birmingham, Cancell Hall Babies' Hosp.—Res. M.O., at rate of £250.

Brecon County.—District M.O.H., £800.

Glasgow University.—Harry Stewart Hutchison prize, £50.

Golden Square Throat, Nose, and Ear Hosp., near Piccadilly Circus, W.1.—Hon. clin. assts.

Grimsby, Scartho Road Infirmary.—Res. M.O., £350.

Halifax Royal Infirmary.—First H.S., at rate of £200.

Huddersfield Royal Infirmary.—H.S. to abnormal maternity dept., at rate of £150.

London County Council.—Temp. asst. M.O.'s, each £250.

Manchester Northern Hosp., Cheetham Hill Road.—Res. H.P. and res. H.S., each at rate of £100.

Manchester Royal Infirmary.—Blood transfusion officer, £300. Also H.P.'s and H.S.'s to spec. depts., each at rate of £50.

Manchester, Withington Hosp.—Res. asst. M.O., at rate of £200.

Neath Borough.—M.O.H., £800.

Nottingham General Hosp.—H.S. to orthopædic and fracture dept., at rate of £150.

Sunderland Children's Hosp.—H.S. and H.P., each at rate of £120.

Wolverhampton Royal Hosp.—Res. surg. O., £200.

York County Hosp.—H.S. to eye, ear, nose, and throat dept., £150.

DOWN WITH SPECIALISM

Dr. Joseph Jerger, who in "Doctor—Here's your Hat" (Jonathan Cape. 1939. Pp. 349. 10*s.* 6*d.*) has written an account of his life in the middle west of the United States, is an Englishman. At the end of last century he was on his way home from Australia to study medicine at Oxford, but threw away his small capital in trying to join in the Boer war. On the advice of Mark Twain, whom he met on the boat, he decided to work his way through a medical school in America, on the assumption that it was impossible to do this in England. Here he was wrong, though it has seldom been done. On the other hand, the possibility of a young man earning his living while studying medicine was for long one of the glories of the Scottish schools, and this tradition has sent London, from the farm and the manse, some of its foremost doctors. In America more and more undergraduates pay their own way, and it might be well if this practice became normal in England. Dr. Jerger, in any case, brought it off, and proceeded to practise with success first in Iowa and then in Chicago. The aim of his book is to defend the family doctor from being handed his hat and ousted by the specialist. There may be need for such a defence in spite of what our Special Commissioner says, but Dr. Jerger is not fully qualified for the job. He was not really a family doctor; he was a surgeon in a country town who did a bit of general practice. There may still be parts of the world where any practitioner may be called on to do a tracheotomy, open an abdomen for peritonitis after attempted self-abortion, or do a cæsarean section, but he will be well advised when faced with a lacerated wound involving the knee-joint not to follow Dr. Jerger by doing a primary resection and fixing the bones with tenpenny nails. Dr. Jerger's case came off, as did the one where he tucked a lacerated forearm under the skin of the abdomen. His experience must have been vast, or by the law of averages he could never have brought off so many miracles. How far the general practitioner's sphere should extend is a pressing problem nowadays, and those interested should read Dr. Jerger's book, for though they may not agree with his views they will find them sometimes amusing and always stimulating.

NOTES, COMMENTS AND ABSTRACTS

A SHORTAGE OF PATIENTS?

LIKE all other professions medicine and nursing have been faced with a good deal of unemployment since the beginning of the war. The dislocation caused by the reorganisation of our lives on a war-time basis is probably not permanent, but in its temporary way it has now lasted for four months, and this period of waiting has been especially hard for nurses, who usually have had but scanty resources to fall back on. It has been suggested that this unemployment is due to the replacement of trained nurses by untrained nursing auxiliaries. But Miss Florence Horsburgh on Dec. 12 told a deputation from the Nurses Emergency Committee to the Ministry of Health that only 74 nursing auxiliaries are employed in the London sectors. She attributed the unemployment to difficulties inherent in a period of transition and adjustment and to the movement of population. It is significant that most of the unemployment seems to be among private nurses. Many of those who were formerly employed on a temporary non-residential basis at institutions have been dismissed, for with the closing down of beds extra help is no longer needed. Others have been asked to come and live in, and for a nurse who has a home to maintain this is often impossible. Many engaged in nursing private cases have found their patients scattered through various reception areas. The Royal College of Nursing, which also sent a deputation to the Ministry on Nov. 14, has now set up an advisory bureau to help its members and particularly those engaged in private nursing. At Bristol and Sheffield for instance a shortage of nurses is reported, and it is hoped that by pooling such information the bureau may be able to redistribute nurses in the wake of the evacuated population. The nursing profession is one of our national assets and we should be foolish not to use it with wisdom and economy.

EARTHQUAKES

ONLY those who have had actual experience of an earthquake can appreciate its terrors: when the solid earth heaves like a troubled sea, cracks open, and demolishes in a minute buildings that would have stood a thousand years. The swiftness of its destruction causes huge casualty rolls in a town, for buildings crash on the inhabitants before they can possibly escape. This is but the beginning. Fire may break out, as in the Japanese earthquake of 1923; in towns near the sea huge waves may add to the chaos, as was the case in Lisbon, again in Tokio and now on the Black Sea; or, as in Anatolia there may be floods from torrential rains and overflowing rivers. After the earthquake a multitude of medical and sanitary problems arise. Food, water, and shelter are immediate needs. Water supplies usually fail and the remaining sources are readily contaminated, adding the risks of enteric and dysentery to those of other epidemic diseases such as typhus and smallpox. Shelter may be of prime importance, as it is in the present terrible disaster in Anatolia where intense cold has multiplied the sufferings of the homeless. There are never enough doctors, nurses and hospitals to treat the injured. Transport must be found despite the difficulties of damage to bridges, railways and roads—again a feature of the Turkish earthquake. Shortage of drugs and dressings is always acute, but here aircraft can often help; in the Chilian earthquake in 1939 supplies of antitetanic and anti-gas-gangrene sera sent by air saved many lives. The disposal of the dead is a huge task and may indeed be impossible. When Quetta was destroyed in June 1935 only a small proportion of the bodies were recovered, and the city was then sealed to prevent the spread of pestilence. The proportion of fatal casualties to the total is always high in earthquake catastrophies. For example, in Tokio and Yokohama in 1923 some 99,000 were killed, 104,000 injured, and 43,000 missing, and it may be taken that most of the missing were killed—i.e., over half the casualties were fatal. The deaths in Anatolia are put at anything from 15,000 to 50,000. Approximate figures for the deaths in the other major earthquakes of this century are: Kangra Valley (1905) 20,000; Calabria (1905) 5000; Nicaragua (1906) thousands; San Francisco (1906) 1000; Valparaiso (1908) several thousands; Messina and Reggio (1908) 77,000; Istambul (1912) over 1200; Abruzzia (1915) 24,000; China (1920) estimated at 180,000; Turbat i Haidari, Iran (1923) 4000; Quetta (1935) over 18,000; Chile (1939) 30,000.

Earthquakes are classified into four merging types: rock-falls, which are relatively unimportant; volcanic, which usually involve a small area; tectonic, caused by the extension of pre-existing rock faults or sometimes by the actual fracturing of a fault several miles below the surface; and bathyseisms, where the disturbance is much deeper, say 250 miles down. The region where the primary disturbance takes place is the hypocentre, and the point vertically above it the epicentre. Mapping of epicentres shows there are two great seismic zones, one the Mediterranean-Himalayan, the other the Ando-Japanese-Malayan. The movements produce vibrations which are detectable thousands of miles away by the seismograph, and forewaves precede the major disturbances. Earthquakes are also observed to follow certain periodicities. Through such observations it may become possible to predict earthquakes by methods similar to those successfully applied to the prediction of volcanic eruptions. Much attention has been given, especially in Japan, to designing buildings to resist earth shocks. Frank Lloyd Wright designed a hotel in Tokio with this in view, and it was one of the least damaged buildings in the city. Thus, though man will never be able to control earthquakes, seismologists may help him to mitigate their worst consequences.

THE RED CROSS IN FINLAND

THE British Red Cross and the Order of St. John are sending supplies of surgical materials to Finland; these include ether, ethyl chloride and other anæsthetics, antitetanic serum, catgut and silk sutures, and anti-mustard gas ointment. Help for Finland's Red Cross services is also being sent by the societies of Denmark, Norway and Sweden. Norway alone has sent over 2½ million Finnish marks for this purpose. The Northern Association (Foreningen Norden) and the Norwegian Red Cross Society have organised an ambulance service with a 50-bed field hospital which was to be sent to Finland before the end of 1939. Prof. Johan Holst of the University of Oslo, a surgeon with an international reputation, is in charge of this unit to which three other Norwegian doctors are attached. The unit includes over half a score of Red Cross nurses as well as several orderlies, technicians and others. At the same time the Norwegian Red Cross is sending money and stores to the north of Norway for the relief of Finnish refugees.

SERUM FOR TRANSFUSION

IT would need a courageous experimenter to give 500 c.cm. of horse serum intravenously to a man. Yet this was successfully done in 1918 according to P. Brodin and F. Saint-Girons (*Bull. Soc. méd. Hôp. Paris*, Nov. 10, 1939, p. 1224). They point out that after a severe hæmorrhage the patient does not die of lack of red cells but of lowered blood-volume. If the blood-volume is reduced suddenly by more than 25 per cent. death results. They therefore suggest that instead of storing blood, which will not keep long and is likely to be wasted, stocks of serum should be prepared—preferably human—for transfusion in the place of whole blood. The advantages of serum or plasma transfusion over whole blood in the treatment of shock and burns have already been mentioned in these columns, but no-one seems to have explored the possibilities of the horse.

SEPTEM CONTRA MUNDUM: A CENTENARY

THE centenary of the birth of Sophia Jex-Blake recalls the persistent fight which was waged before women were able to qualify as doctors. "Such struggles do not persist and succeed, according to my experience," wrote Sir James Stansfeld, "without the accompanying fact, the continuous thread, as it were, of one constant purpose and dominant will. Dr. Sophia Jex-Blake has made that greatest of all contributions to the end attained. I do not say that she has been the ultimate cause of success. The ultimate cause of success has been simply this, that the time was at hand."

Miss Jex-Blake was the youngest child of well-to-do parents. Her dynamic nature probably suffered from the limited education then considered sufficient for young ladies, but when she entered the newly formed Queen's College for Women she found herself. On a visit to America to study the question of women's education Miss Jex-Blake met Dr. Lucy Sewall, resident physician to the New England Hospital for Women and Children in Boston, and this friendship proved the turning point of her life. Miss Jex-Blake remained in Boston for some time on account of her health. Soon she is writing to her mother, "I find myself getting desperately in love with medicine as a science and as an art, to an extent I could not have believed possible."

She returned to England in 1868 and shortly afterwards set about to qualify as a doctor. Finding difficulties wherever she turned in the south, she applied to the dean of the medical faculty of the University of Edinburgh, and obtained permission to attend lectures at the medical school in the summer term; the authorities probably hoped thus to damp the ardour of this solitary woman student. This permission had been granted only by the medical faculty and senatus, and it was now vetoed by the university court. The press gave this decision publicity and Miss Jex-Blake's cause was strengthened by the addition of several women anxious to qualify as doctors. The university court agreed to admit these students to separate classes from the session 1869–70; but it was not easy to find professors to undertake this extra work, even though Miss Jex-Blake guaranteed the fees. An application to admit the women students to the wards of the Royal Infirmary had resulted in unpleasant mobbing, while an ill-judged remark in a speech made by Miss Jex-Blake had been the subject of a libel action brought by Professor Christison with a verdict in favour of the pursuer and one farthing's damages, and heavy costs.

The university now endeavoured to make it impossible for the women to complete their studies. If they would waive the question of graduation, they were offered certificates of proficiency. "They forgot," wrote Miss Jex-Blake, "that though a degree is 'not essential' to a medical education, it *is* absolutely indispensable to any practical use of it,—that is to any lawful practice of the medical profession." A motion that in honour and justice the university was bound "to render it possible for these women who have already commenced their studies, to complete them," was defeated at a meeting of the council by a narrow majority. THE LANCET supported the women and said, "Edinburgh stands convicted of having acted unfairly towards seven ladies, whom she first accepted as pupils, and then stopped halfway in their career." Why did not Miss Jex-Blake now qualify abroad? Because she rightly felt that, until means of education were provided here, only a very small number of women would become doctors.

Miss Jex-Blake had now become a public character and her cause one of national importance. Notice was given in the House of Commons of a bill to give power to the Scottish universities to educate women in medicine and grant them the ordinary medical degrees. Before this could be passed, however, Mr. Gladstone's government fell. But the matter was not shelved, though it was not until 1876 that the Russell Gurney Enabling Act was passed and it became legally possible for women to qualify as doctors. Thus closed a seven-years struggle which had absorbed all Miss Jex-Blake's energy and time. She now hastened to complete her studies and was admitted to the British register through an Irish college. Her work was not yet ended. She set up in practice in Edinburgh and founded the schools of medicine for women in London and Edinburgh and also a hospital for women in Edinburgh. She will be remembered for her "large courage, insight and constancy" which helped to open the door of the medical profession to women in this country.

TUBERCULOSIS IN GERMANY

IN the last war the death-rate from tuberculosis in Germany was doubled between 1914 and 1918. In the army alone the rate in 1914 was only a tenth of what it was in 1918. In explaining the disastrous increase in the army, Dr. Deist of Giessen (*Deut. Tuberk.-Blatt.* November, 1939) attaches comparatively little importance to projectile wounds of the lungs, to the loss of limbs, to poison gas or to prophylactic inoculations, but he does attach a sinister significance to general anæsthesia associated with loss of blood, transport and a long operation. He quotes Steinmeyer as having found that 50 per cent. of the soldiers suffering from open pulmonary tuberculosis had undergone general anæsthesia for some war injury. He thinks infection from without more important than reactivation of old tuberculous foci in time of war. He has only disparaging comments to make on the finding of tubercle bacilli in the sputum as a criterion of activity, for tubercle bacilli are, like the breath of life, here today and gone tomorrow, and so much depends on the technique and diligence of the individual microbe hunter.

SUGGESTED CHANGES IN THE B.P.

Two further reports of committees appointed by the Pharmacopœia Commission have now been published. These are by the committees on pharmacy and pharmacognosy, and on general chemistry. The purpose of issuing these reports is to invite criticisms before they are embodied in the next pharmacopœia in 1941. The pharmacy committee's report gives examples of the type of monograph which they think should replace those now current, belladonna leaf, belladonna root, cinchona and nux vomica being the drugs selected. From these specimens it is clear that the proposal is to describe the official parts of plants in much greater detail than has been customary in the past; particularly noticeable is the precision of the descriptions of vegetable drugs in the form of powder and the care which has been taken to ensure the avoidance of inferior grades of drugs. The report also sets out proposed standards and tests for purity of individual vegetable drugs in the earlier pharmacopœia and of three articles which it is proposed to restore to the next one—namely, galls, gelsemium and kino. It is interesting to note a recommendation that drugs containing volatile oils—for instance, clove, caraway fruit and cardamoms—should be standardised on the volatile-oil content by a method which was worked out by the committee on pharmaceutical chemistry and published in an earlier report. In the recommendation concerning syrups an attempt has been made to provide formulas based on a concentrated liquid extract, tincture or liquor which can be diluted by the dispenser with syrups at the time of dispensing; thus a new formula for syrup of senna is based on the addition of syrup to a liquid extract of senna containing oil of coriander. One of the advantages of these concentrated liquors is their superior keeping properties. The problem of concentrated infusions is still being investigated. Among the changes recommended a noteworthy one is the addition of sodium metabisulphite, as a preservative, to solution of adrenaline hydrochloride, an addition which is recognised in certain foreign pharmacopœias. New monographs are recommended for Ringer's solution and spirit of lavender and it is proposed to restore syrup of codeine phosphate which was included

in the 1914 pharmacopœia. Among other new monographs proposed are several which appear in the British Pharmaceutical Codex, among them being cod-liver oil emulsion, injection of sodium morrhuate, compound bismuth powder, kino with opium powder, and methyl salicylate liniment. In addition, formulas are suggested for calcium gluconate injection, procaine and adrenaline injection, quinine and urethane injection and tannic acid jelly. It is recommended that a 1 per cent. solution of acriflavine in glycerin should be tried as a stock solution under the name of glycerin of acriflavine, and that at the time of dispensing, this preparation should be diluted with water to form a 0·1 per cent. lotion of acriflavine; this aqueous preparation is proposed because bacteriological experiments have thrown doubt on the activity of acriflavine in the usual oily medium.

The committee on general chemistry recommend a large number of alterations in official tests which make for improved methods of assay and the raising of standards. New monographs proposed in this report are calamine, bismuth subgallate, dried epsom salts (preshadowing the introduction of magnesium sulphate paste), potassium chloride, potassium metabisulphite, anhydrous sodium phosphate and anhydrous sodium sulphate. In a note on æther the committee state that the nomenclature of the two varieties of ethyl ether which are described in the pharmacopœia has given rise to some discussion, and recommend that only the quality of ether designated anæsthetic ether should be employed as an anæsthetic, the quality now described as æther being re-named æther solvens.

CADBURY OF CANTON

Dr. William Cadbury, who this year celebrated the thirtieth anniversary of his first arrival in China, can scarcely have worked there in more difficult circumstances than at present. As superintendent of Canton Hospital, professor of medicine at Lingnan University, and chairman of the Red Cross he represents some of the few constructive forces that are left in that unhappy city. Last year 73 students from Lingnan University, of whom 10 were doctors of medicine, graduated at Hong-Kong. Yet besides continuing its formal academic functions the university still shelters 1500 refugees in its campus, feeds them, educates their children, and cares for their sick. In the spring hundreds of babies suffering from measles and malnutrition were sent to the hospital, which receives financial backing from the Red Cross. During the year three foreign doctors have died—one shot by bandits—but those who remained have carried on with a fine courage.

DOMESTIC METEOROLOGY

Dr. A. J. Copeland writes: At this time of the year, in the Northern latitudes, anyone who takes a piece of personal or bed linen or a suit or dress which has been exposed to the atmosphere, even in a drawer or cupboard, and places same before a source of heat will notice a simple phenomenon. After a variable latent period a white vapour will be seen curling gently upwards like a faint wreath of fog. Its amount depends on the soundness of the walls and roof of the house, its locality, the technique of the laundry, and so forth, but some vapour will always be noticed, even after quite a short exposure to the air. Before it is heated the linen will not necessarily feel damp (a word of insult and dread, like bug, in the British household) but merely cold. This coldness seems to vary directly with the vapour content of the linen, and is especially marked in the case of dresses and suits which have been hanging for some time in the wardrobe. It seems to be a quality of water vapour plus linen, and is not merely due to low external temperature. During the vapour expulsion process, however, the material feels first sticky, then clammy and finally truly damp.

No doubt a meteorologist could explain the Copeland phenomenon in terms of adsorption and capillary concentration, vapour-pressure and the high number of Aitken nuclei of condensation in the neighbourhood of a fire. The amount of water associated with linen or other material at a given temperature is presumably fairly constant for the particular material. In the same way, if powdered coal is dried until it ceases to lose weight and then left in moist air it will increase in weight until the original water content is reached. The same applies to aired linen. Dr. Copeland's only remedy seems to be to install central heating.

BIRMINGHAM AND RADIUM RESEARCH

THE arrangements for placing radium in safety from air attack have already been discussed in these columns.[1] Most London hospitals and national centres had prepared before the war the 50 foot bore holes recommended by the Radium Commission, but a few hospitals were fortunate enough to have tunnels or wells already available with considerably more space. The Birmingham General Hospital has a 60 foot well beneath the building, and because of this it is suggested that Birmingham may become a major research centre for radium therapy in war-time. The 10 gramme radium mass unit belonging to the Radium Beam Research, working under the control of the Medical Research Council at the Radium Institute, may be transferred to Birmingham to take advantage of this special accommodation. It is to be hoped, however, that this organisation will continue under the same control and with the same staff as at present; they have already published one instructive report, and all those interested in radium therapy are watching closely their scientific approach to the difficult question of treatment in cancer of the pharynx, larynx and cervical lymph-nodes.

THE ESCAPE INTO INVALIDISM

PERHAPS the most arresting and original of the papers included in the latest of the pamphlets published for the Medical Society of Individual Psychology is one on the escape into invalidism, by Dr. George Gordon and Dr. W. R. Reynell. Their views on the causes which lead certain people to become invalids without apparently adequate cause, and to be the bane of their medical attendants and families, is worthy of careful study. Unfortunately, on the authors' own showing, the patients themselves are unlikely to benefit by reading the paper. This little book ("The Significance of Dreams, and other Papers." By Drs. E. A. Bennet, George Gordon, W. R. Reynell, Ethel Dukes and F. A. Crookshank. London: The C. W. Daniel Company. Pp. 62. 2*s.* 6*d.*) consists of individual contributions read to the society, dealing with a variety of subjects of psychological interest without any attempt at continuity. They are free from adherence to any one school of psychological thought, a fact that will probably enhance their value in the opinion of most readers.

SCAPULAR SHAPE AND LONGEVITY

THE St. Louis Medical Society has conferred a certificate of merit and a gold medal upon Dr. William Washington Graves, the professor of neuropsychiatry in its school of medicine, for his extensive observations of the scapulæ of man and his deductions therefrom in relation to inherited characteristics in general. Dr. Washington Graves classifies scapulæ broadly, into two categories, convex and scaphoid (straight, concave and mixed), which, he finds, are inherited and remain permanent. The ratio of the two types changes, he has shown, with age, there being a preponderance of the convex in old age not observed in earlier life. The possessors of this type are, therefore, he deduces, more resistant to disease and longer lived. This method of inquiry into the biological value of permanent inherited characteristics he has called "the age-incidence principle of investigation," the discovery of which the society has commemorated in the certificate presented to him.

Corrigendum.—Line 7 of col. 2 of Dr. Hartston's article in our issue of Dec. 23 (p. 1333) should read "as in the rest of the *county*"—i.e., Lincolnshire (parts of Lindsey).

1. See *Lancet*, 1939, **2**, 838.